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DEPARTEMENT MOBILITEIT EN OPENBARE WERKEN
WATERBOUWKUNDIG LABORATORIUM

Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing

Bestek 16EB/05/04

Deelrapport 2.21 : **13-uursmeting Sediview DGD tijdens een gemiddeld getij - lente 2008 – 26/06/2008**

Report 2.21 : **Through Tide Measurement Sediview DGD during an average tide - spring 2008 – 26/06/2008**

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1. INTRODUCTION

1.1. The assignment

This report is part of the set of reports describing the results of the long-term measurements conducted in Deurganckdok aiming at the monitoring and analysis of silt accretion. This measurement campaign is an extension of the study "Extension of the study about density currents in the Beneden Zeeschelde" as part of the Long Term Vision for the Scheldt estuary. It is complementary to the study 'Field measurements high-concentration benthic suspensions (HCBS 2)'.

The terms of reference for this study were prepared by the 'Departement Mobiliteit en Openbare Werken van de Vlaamse Overheid, Afdeling Waterbouwkundig Laboratorium' (16EB/05/04). The repetition of this study was awarded to International Marine and Dredging Consultants NV in association with WL|Delft Hydraulics and Gems International on 10/01/2006. The project term was prolonged with an extra year from April 2007 till March 2008 and a second time prolonged with one extra year from April 2008 till March 2009.

Waterbouwkundig Laboratorium– Cel Hydrometrie Schelde provided data on discharge, tide, salinity and turbidity along the river Scheldt and provided survey vessels for the long term and through tide measurements. Afdeling Maritieme Toegang provided maintenance dredging data. Agentschap voor Maritieme Dienstverlening en Kust – Afdeling Kust and Port of Antwerp provided depth sounding measurements.

The execution of the study involves a twofold assignment:

- Part 1: Setting up a sediment balance of Deurganckdok covering a period of two years, i.e. 04/2007 – 03/2009
- Part 2: An analysis of the parameters contributing to siltation in Deurganckdok

1.2. Purpose of the study

The Lower Sea Scheldt (Beneden Zeeschelde) is the stretch of the Scheldt estuary between the Belgium-Dutch border and Rupelmonde, where the entrance channels to the Antwerp sea locks are located. The navigation channel has a sandy bed, whereas the shallower areas (intertidal areas, mud flats, salt marshes) consist of sandy clay or even pure mud sometimes. This part of the Scheldt is characterized by large horizontal salinity gradients and the presence of a turbidity maximum with depth-averaged concentrations ranging from 50 to 500 mg/l at grain sizes of 60 - 100 μm. The salinity gradients generate significant density currents between the river and the entrance channels to the locks, causing large siltation rates. It is to be expected that in the near future also the Deurganckdok will suffer from such large siltation rates, which may double the amount of dredging material to be dumped in the Lower Sea Scheldt.

Results from the study may be interpreted by comparison with results from the HCBS and HCBS2 studies covering the whole Lower Sea Scheldt. These studies included through-tide measurement campaigns in the vicinity of Deurganckdok and long term measurements of turbidity and salinity in and near Deurganckdok.

The first part of the study focuses on obtaining a sediment balance of Deurganckdok. Aside from natural sedimentation, the sediment balance is influenced by the maintenance and capital dredging works. This involves sediment influx from capital dredging works in the Deurganckdok, and internal relocation and removal of sediment by maintenance dredging works. To compute a sediment

balance an inventory of bathymetric data (depth soundings), density measurements of the deposited material and detailed information of capital and maintenance dredging works will be made up.

The second part of the study is to gain insight in the mechanisms causing siltation in Deurganckdok, it is important to follow the evolution of the parameters involved, and this on a long and short term basis (long term & through-tide measurements). Previous research has shown the importance of water exchange at the entrance of Deurganckdok is essential for understanding sediment transport between the dock and the river Scheldt.

1.3. Overview of the study

1.3.1. Reports

Reports of the project 'Opvolging aanslibbing Deurganckdok' between April 2008 till March 2009 are summarized in Table 1-1. An overview of the HCBS2 and 'Opvolging aanslibbing Deurganckdok' (between April 2006 till March 2008) reports are given in APPENDIX K.

This report 2.21, is one of a set of reports that gains insight in sediment and water transport between Deurganckdok and the river Scheldt, which belongs to the second part of this project.

Table 1-1: Overview of Deurganckdok Reports

Report	Description
Sediment Balance: Bathymetry surveys, Density measurements, Maintenance and construction dredging activities	
1.20	Sediment Balance: Three monthly report 1/4/2008 - 30/6/2008 (I/RA/11283/08.076/MSA)
1.21	Sediment Balance: Three monthly report 1/7/2008 – 30/9/2008 (I/RA/11283/08.077/MSA)
1.22	Sediment Balance: Three monthly report 1/10/2008 – 31/12/2008 (I/RA/11283/08.078/MSA)
1.23	Sediment Balance: Three monthly report 1/1/2009 – 31/03/2009 (I/RA/11283/08.079/MSA)
1.24	Annual Sediment Balance (I/RA/11283/08,080/MSA)
Factors contributing to salt and sediment distribution in Deurganckdok: Salt-Silt (OBS3A) & Frame measurements, Through tide measurements (SiltProfiling & ADCP) & Calibrations	
2.20	Through tide measurement Sediview DGD during average tide Spring 2008 – 19 June 2008 (I/RA/11283/08.081/MSA)
2.21	Through tide measurement Sediview DGD during average tide Spring 2008 –26 June 2008 (I/RA/11283/08.082/MSA)
2.22	Through tide measurement Sediview DGD during neap tide Summer 2008 – 24 September 2008 (I/RA/11283/08.083/MSA)
2.23	Through tide measurement Sediview DGD during spring tide Summer 2008 – 30 September 2008 (I/RA/11283/08.084/MSA)
2.24	Through tide measurement Sediview DGD during neap tide Autumn 2008 (I/RA/11283/08.085/MSA)
2.25	Through tide measurement Sediview DGD during spring tide Autumn 2008 (I/RA/11283/08.086/MSA)
2.26	Through tide measurement Sediview DGD during neap tide Winter 2009 (I/RA/11283/08.087/MSA)

Report	Description
2.27	Through tide measurement Sediview DGD during spring tide Winter 2009 (I/RA/11283/08.088/MSA)
2.28	Through tide measurement ADCP eddy DGD Summer 2008 – 1 October 2008 (I/RA/11283/08.089/MSA)
2.29	Through tide measurement Siltprofiler DGD Summer 2008 – 29 September 2008 (I/RA/11283/08.090/MSA)
2.30	Through tide measurement Siltprofiler DGD Winter 2009 (I/RA/11283/08.091/MSA)
2.31	Through tide measurement Salinity Profiling DGD Winter 2009 (I/RA/11283/08.092/MSA)
2.32	Salt-Silt distribution Deurganckdok: Six monthly report 1/4/2008 - 30/9/2008 (I/RA/11283/08.093/MSA)
2.33	Salt-Silt distribution Deurganckdok: Six monthly report 1/10/2008 – 31/3/2009 (I/RA/11283/08.094/MSA)
2.34	Calibration stationary & mobile equipment Autumn 2008 (I/RA/11283/08.095/MSA)
Boundary Conditions: Upriver Discharge, Salt concentration Scheldt, Bathymetric evolution in access channels, dredging activities in Lower Sea Scheldt and access channels	
3.20	Boundary conditions: Six monthly report 1/4/2008 – 30/09/2008 (I/RA/11283/08.096/MSA)
3.21	Boundary conditions: Six monthly report 1/10/2008 – 31/03/2009 (I/RA/11283/08.097/MSA)
Analysis	
4.20	Analysis of Siltation Processes and Factors (I/RA/11283/08.098/MSA)

1.3.2. Measurement actions

Following measurements have been carried out during the course of this project:

1. Monitoring upstream discharge in the Scheldt river
2. Monitoring Salt and sediment concentration in the Lower Sea Scheldt taken from on permanent data acquisition sites at Lillo, Oosterweel and up- and downstream of the Deurganckdok.
3. Long term measurement of salt distribution in Deurganckdok.
4. Long term measurement of sediment concentration in Deurganckdok
5. Monitoring near-bed processes in the central trench in the dock, near the entrance as well as near the landward end: near-bed turbidity, near-bed current velocity and bed elevation variations are measured from a fixed frame placed on the dock's bed.
6. Measurement of current, salt and sediment transport at the entrance of Deurganckdok for which ADCP backscatter intensity over a full cross section are calibrated with the Sediview procedure and vertical sediment and salt profiles are recorded with the SiltProfiler equipment
7. Through tide measurements of vertical sediment concentration profiles -including near bed highly concentrated suspensions- with the SiltProfiler equipment. Executed over a grid of points near the entrance of Deurganckdok.

8. Monitoring dredging activities at entrance channels towards the Kallo, Zandvliet and Berendrecht locks
9. Monitoring dredging and dumping activities in the Lower Sea Scheldt

In situ calibrations were conducted on several dates to calibrate all turbidity and conductivity sensors, a description can be found in IMDC (2006a; 2007a; 2008f; 2008o; 2009c).

1.4. Structure of the report

This report is the factual data report of the through tide measurements at the entrance of Deurganckdok on the 26th of June 2008. The first chapter comprises an introduction. The second chapter describes the measurement campaign and the equipment. Chapter 3 describes the course of the actual measurements. The results and processed data are presented in Chapter 4, whereas chapter 5 gives a preliminary analysis of the data.

2. THE MEASUREMENT CAMPAIGN

2.1. Overview of the parameters

The first part of the study aims at determining a sediment balance of Deurganckdok and the net influx of sediment. The sediment balance comprises a number of sediment transport modes: deposition, influx from capital dredging works, internal replacement and removal of sediments due to maintenance dredging (Figure 2-1).

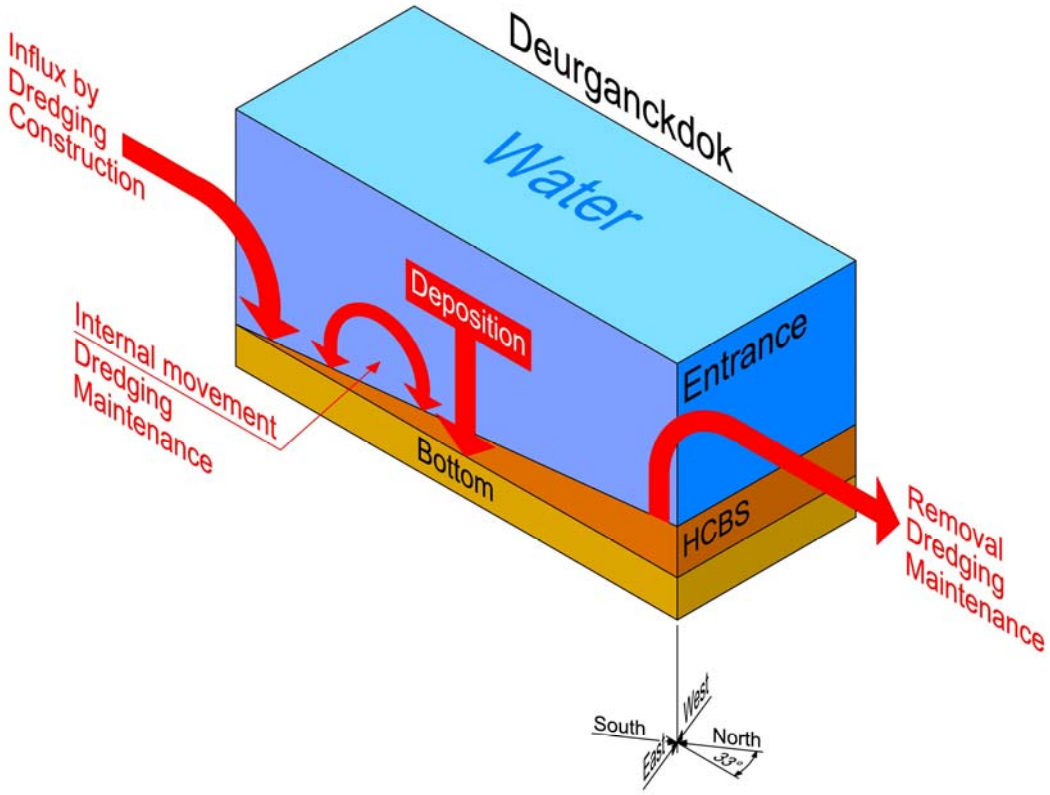


Figure 2-1: Elements of the sediment balance

A net deposition can be calculated from a comparison with a chosen initial condition t_0 (Figure 2-2). The mass of deposited sediment is determined from the integration of bed density profiles recorded at grid points covering the dock. Subtracting bed sediment mass at t_0 leads to the change in mass of sediments present in the dock (mass growth). Adding cumulated dry matter mass of dredged material removed since t_0 and subtracting any sediment influx due to capital dredging works leads to the total cumulated mass entered from the Scheldt river since t_0.

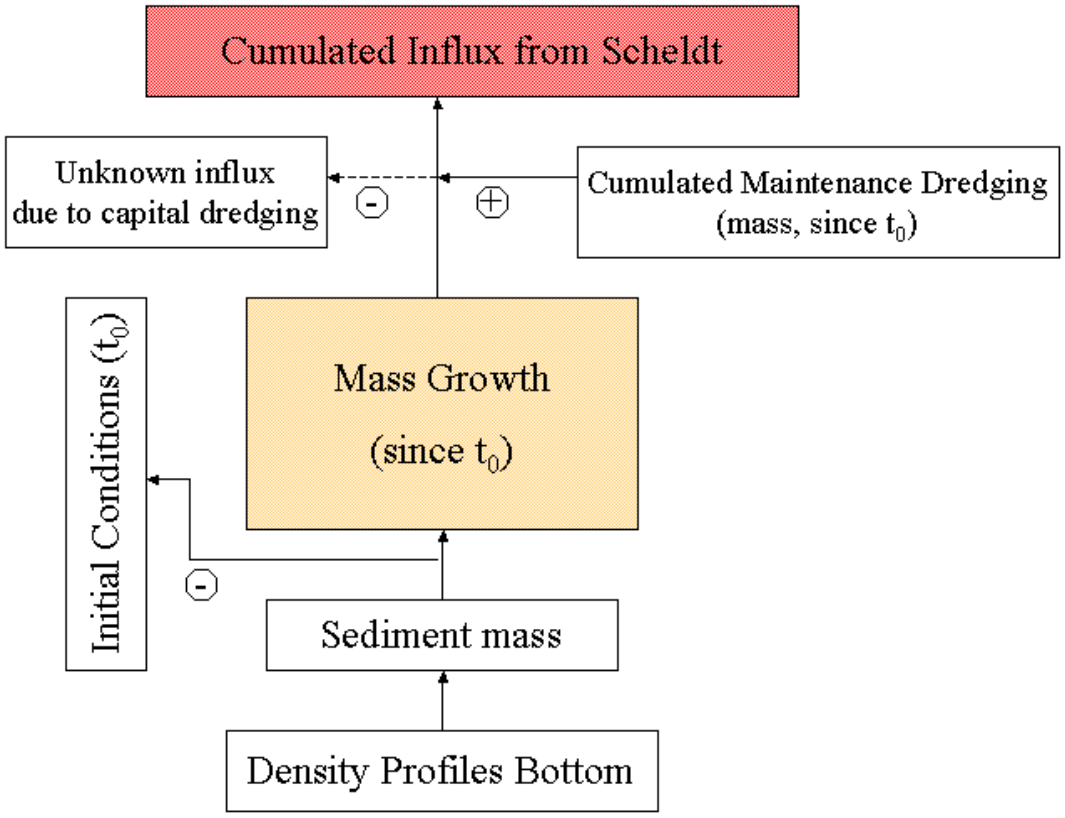


Figure 2-2: Determining a sediment balance

The main purpose of the second part of the study is to gain insight in the mechanisms causing siltation in Deurganckdok. The following mechanisms will be aimed at in this part of the study:

- Tidal prism, i.e. the extra volume in a water body due to high tide
- Vortex patterns due to passing tidal current
- Density currents due to salt gradient between the Scheldt river and the dock
- Density currents due to highly concentrated benthic suspensions

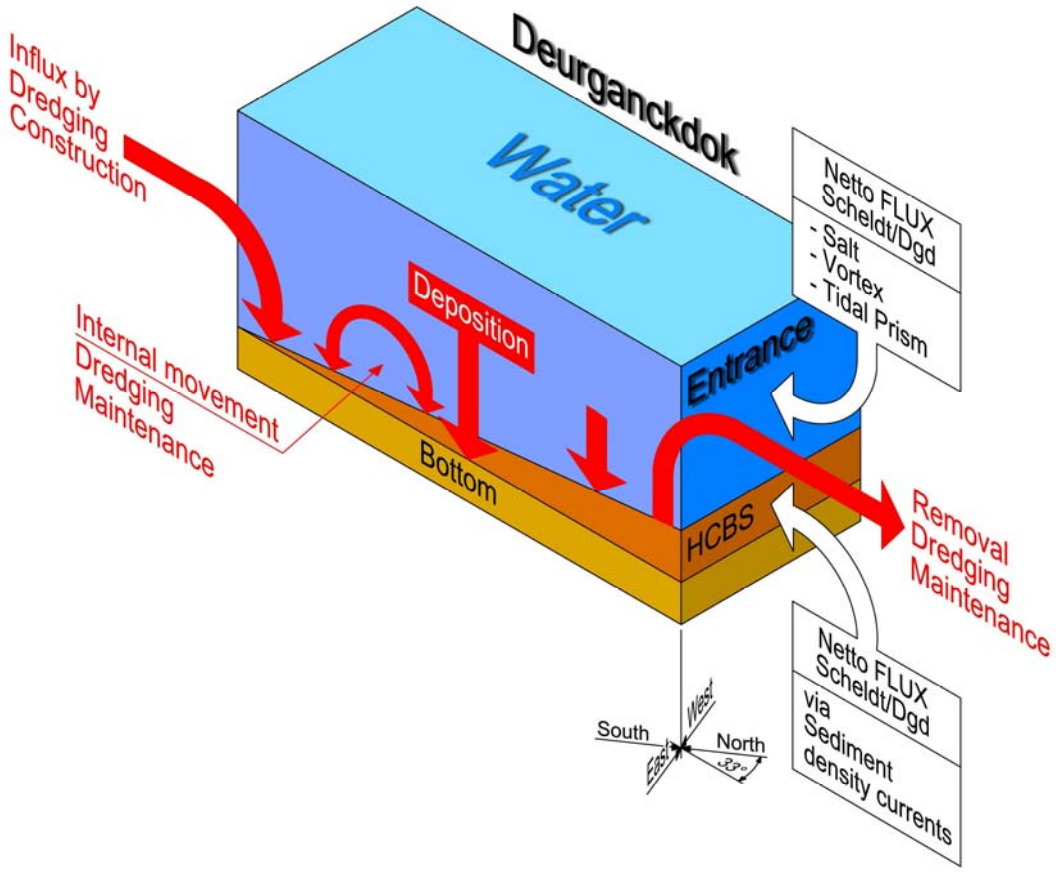


Figure 2-3: Transport mechanisms

These aspects of hydrodynamics and sediment transport have been landmark in determining the parameters to be measured during the project. Measurements will be focussed on three types of timescales: one tidal cycle, one neap-spring cycle and seasonal variation within one year.

Following data are being collected to understand these mechanisms:

- Monitoring the freshwater input (discharge) from the tributaries into the river Scheldt.
- Monitoring salinity and sediment concentration in the Lower Sea Scheldt at permanent measurement locations at Oosterweel, up- and downstream of the Deurganckdok.
- Long term measurement of salinity and suspended sediment distribution in Deurganckdok.
- Monitoring near-bed processes (current velocity, turbidity, and bed elevation variations) in the central trench in the dock, near the entrance as well as near the current deflecting wall location.
- Dynamic measurements of flow pattern, salinity and sediment transport at the entrance of Deurganckdok.
- Through tide measurements of vertical sediment concentration profiles -including near bed high concentrated benthic suspensions.
- Monitoring dredging activities at the entrance channels towards the Kallo, Zandvliet and Berendrecht locks as well as dredging and dumping activities in the Lower Sea Scheldt and Deurganckdok in particular.

In situ calibrations were conducted on several dates to calibrate all turbidity and conductivity sensors.

2.2. Description of the measurement campaign

2.2.1. Purpose of the measurement campaign

The purpose of the measurements was to determine the cross-section distribution of the suspended sediment concentration, sediment flux, flow velocity and water discharge over a sailed transect DGD during a complete tidal cycle. The final purpose is to make a water and a sediment balance from the river Scheldt at Deurganckdok during a tidal cycle by integrating the water discharge and sediment flux.

This report focuses on the through tide measurements at the entrance of Deurganckdok (transect DGD, see (Figure 2-4).

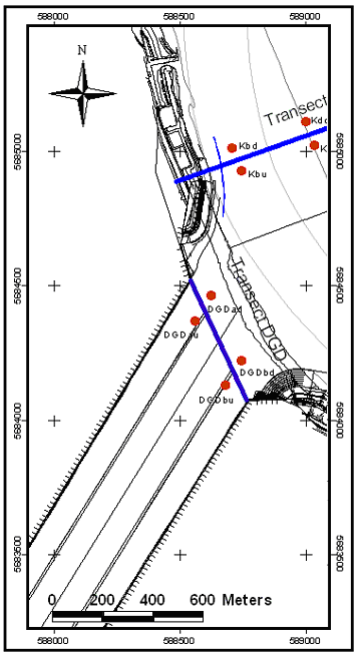


Figure 2-4: Map of sailed transect and calibration points at Deurganckdok on 26th of June 2008

2.2.2. Measurement procedure

Flow velocity, Turbidity, Salinity and Temperature measurements were conducted on the 26th of June from 5h00 MET until 18h00 MET. From the survey vessel Scheldewacht II a measurement cycle was completed every 30 minutes. The vessel with a mounted ADCP sailed a fixed transect from the right bank to the left bank and vice versa as a backup transect (Table 2-1). Profiles were gathered to calibrate the ADCP transects for temperature, salinity and suspended sediment concentration to be used in Sediview.

Two calibration profiles were collected for each transect (Table 2-2):

- One before sailing the transect at the bank where the start of the transect was
- One after sailing the transect at the bank where the transect ended

During these calibrations, a fish with a CTD-OBS was lowered to the bottom. The downcast was interrupted at two depths, one in the upper half of the water column (between 3 and 7 m from the water surface) and one at 4 meters above the bottom. At the two different depths samples were taken for calibration, and are used as ‘ground truth’ for all suspended sediment concentration

measurements (OBS and Sediview). The other instruments logged continuously during the downcast. Conductivity, Temperature and Depth was logged by the CTD-probe, while turbidity was recorded by the OBS.

Table 2-1:Transect of the Flow Measurements on 26th of June 2008 (UTM31 ED50)

Measurement location	Left Bank Easting	Left Bank Northing	Right Bank Easting	Right Bank Northing	Avg Length [m]	Avg Course [degr.]
Transect DGD	588 541	5 684 527	588 765	5 684 056	521	335

Table 2-2 Positions of the calibration points for 26th of June 2008 during flood and ebb

Measurement point	Bank	Easting (UTM31 ED50)	Northing (UTM31 ED50)
Flood			
DGDau	Left	588561	5684369
DGDbu	Right	588682	5684113
Ebb			
DGDad	Left	588623	5684470
DGDbd	Right	588745	5684214

2.3. The equipment

2.3.1. ADCP

The current measurements were conducted using an RD Instruments ADCP 600 kHz Workhorse with beam angle 30°. For positioning the GPS onboard the vessel Scheldewacht II was used. For the measurement of the heading a gyrocompass was installed.

This 600 KHz ADCP system was mounted on a steel pole underneath the central axis of the vessel. The transducer set was looking vertically downwards to the bottom. Transceiver unit and computer system were connected to peripherals such as the differential GPS-receiver, the heave compensator and the gyrocompass.

During the measurements the ADCP constantly measured upstream from the vessel. The acquisition software of Winriver was used. The main settings are given in Table 2-3.

Table 2-3: Main Configuration Settings of ADCP

Main configuration settings of ADCP 600kHz Worhhorse:
Cell depth: 0.5 m
Number of cells: 50
Number of Water pings per ensemble: 2
Number of Bottom Track pings per ensemble: 2
Time between ensembles: 0
Averaging: None
Speed of Sound: Fixed 1500 m/s
Salinity 0 psu
3-beam solution: enabled
Beam angle: 30°

2.3.2. OBS - CTD

A D&A type OBS 3A was used to measure depth, conductivity, temperature and turbidity.

Measured parameters by the OBS 3A sensor: temperature (°C), conductivity (µS/cm), absolute pressure (m), turbidity (NTU).

On Scheldewacht II, the OBS 3A device was mounted on a tow fish. The resulting record is filled-up with GPS-time, sample number, and planimetric position of the GPS-receiver. Sampling frequency is 1 reading per second.

The technical details on the OBS 3A are given in the winter calibration Report of the HCBS 1 measurement campaign. (IMDC, 2006a)

2.3.3. Pump Sampler

A water sampler was attached nearby the turbidity sensor taking water samples. Samples were collected in 1 litre sampling bottles. The pumping speed of the water sampler was tested at the start of the measurement campaign on board. Dye was used to time the duration between the intake of the dye and exit at the sampling end of the sampler on board. The duration between intake and exit at the end was 26 seconds.

3. COURSE OF THE MEASUREMENTS

3.1. Measurement periods

At Deurganckdok ADCP tracks were sailed about every 15 minutes for 13 hours, in total 51 cross-sections.

Calibration profiles were taken at 2 locations (left bank, right bank). During every cycle, 1 calibration profile was taken serving as the second calibration of the previous transect and as the first calibration point of the current transect, resulting in a total of 50 profiles. APPENDIX A gives the start and end points of the tracks, the sailed length and the course.

3.2. Hydro-meteorological conditions during the measurement campaign

3.2.1. Vertical tide during the measurements

The vertical tide was measured at the Liefkenshoek tidal gauges. Graphs of the tide at Liefkenshoek on the 26th June of 2008 can be found in APPENDIX B. Table 3-1 gives the most important characteristics (high and low tide) of the tide at those gauges on the 26th of June 2008.

Table 3-1: High and low tide at Liefkenshoek on 26/06/2008

Liefkenshoek Tidal Gauge		
26 June 2008		
	Time [MET]	***Water level [m TAW]***
LW (1)	2:50	-0.14
HW (2)	8:20	5.05
LW (3)	14:40	0.31
HW (4)	20:40	5.02

In Table 3-2 the tidal characteristics of the tide on the 26th of June 2008 are compared to the average tide over the decade 1991-2000 (AMT, 2003).

Table 3-2: Comparison of the tidal characteristics of 26/06/2008 with the average tide, the average neap tide and the average spring tide over the decade 1991-2000 for Liefkenshoek.

	Neap tide (1991 - 2000)	***Avg Tide (1991 - 2000)***	***Spring Tide (1991 - 2000)***	***Tide 26/06/2008***
Water level [m TAW]				
LW (1)	0.39	0.05	-0.18	-0.14
HW (2)	4.63	5.19	5.63	5.05
LW (3)	0.39	0.05	-0.18	0.31
HW (4)	-	-	-	5.02
Tidal difference [m]				
Rising (1 to 2)	4.24	5.14	5.81	5.19
Falling (2 to 3)	4.24	5.14	5.81	4.74
Rising (3 to 4)	4.24	5.14	5.81	4.71
Duration [hh:mm]				
Rising (1 to 2)	5:59	5:34	5:16	5:30
Falling (2 to 3)	6:40	6:50	7:02	6:20
Rising (3 to 4)	5:59	5:34	5:16	6:00
Tide (1 to 3)	12:39	12:24	12:18	11:50
Tide (2 to 4)	12:39	12:24	12:18	12:20
Tidal coefficient				
Rising (1 to 2)	0.82	1.00	1.13	1.01
Falling (2 to 3)	0.82	1.00	1.13	0.92
Rising (3 to 4)	0.82	1.00	1.13	0.92

The tidal coefficients from 0.92 up to 1.01 for the measured tide of the 26th of June 2008 indicate that this tide has a tidal range between a neap and an average tide for the decade of 1991-2000, and can be classified as an average tide.

3.2.2. Meteorological data

Meteorological data at Hove was obtained from the Weather Underground website (Wunderground, 2008).

The weather on the 26th of June 2008 was clear without precipitation and the wind blew from the south west at an average velocity of 8 km/h with maximal gust velocity of 29 km/h. The air temperature varied between 8 and 15°C.

3.3. Navigation information

An overview of the navigation at the measurement location is given in APPENDIX C.

3.4. Remarks on data

No remarks on the data.

4. PROCESSING OF DATASETS

4.1. Calibration of the OBS turbidity sensor

A crucial aspect of the accuracy and reliability of the data concerns the calibration of the OBS turbidity sensor. The calibration of the OBS sensor is necessary to convert turbidity into Suspended Sediment Concentration (SSC). We use here an in situ calibration, which is more representative of the actual measurement conditions at that moment. At some depths water samples were taken by the pump sampler and were analysed by a laboratory for SSC. These SSC were used as 'ground truth' to calibrate the OBS turbidity sensor. The calibration curve can be found in APPENDIX D.

4.2. Methodology of processing of the ADCP data with Sediview

DRL Software's Sediview was used to process the ADCP data. Sediview is designed to derive estimates of suspended sediment concentration throughout the water column using acoustic backscatter data obtained by ADCPs manufactured by RD Instruments of San Diego, California.

4.2.1. Acoustic backscatter theory

The acoustic theory governing backscatter from particles suspended in the water column is complex, but the following simplified formula serves to introduce the main factors that are relevant:

$$E = SL + SV + Constant - 20\log(R) - 2\alpha_w R$$

Where:

- E = echo intensity,
- SL = transmitted power,
- SV = backscatter intensity due to the particles suspended in the water column,
- α_w = a coefficient describing the absorption of energy by the water,
- R = the distance from the transducer to the measurement bin.

The term 20log(R) is a simple geometric function which accounts for the spherical spreading of the beam. The constant is required because each ADCP has specific performance characteristics.

In order to measure the suspended sediment concentration in the water column it is necessary to relate the backscattered sound intensity to the mass concentration in the water. For the purposes of measuring solids concentration on site, it can be shown that the relationship is as follows (derived from Thorne and Campbell, 1992 and Hay, 1991 in DRL (2003)):

$$Log_{10}M_r = \{dB + 2r(\alpha_w + \alpha_s) - K_s\}S^{-1}$$

Where:

- $M(r)$ = mass concentration per unit volume at range, r
- S = relative backscatter coefficient
- K_s = site and instrument constant
- dB = the measured relative backscatter intensity (corrected for beam spreading)
- α_w = water attenuation coefficient
- α_s = sediment attenuation coefficient, which is a function of the effective particle size

In this expression there are four unknowns: *S*, *Ks*, α_w and α_s. These parameters are to be determined within Sediview (APPENDIX F).

4.2.2. Water sampling and transect sailing

To calibrate Sediview for suspended sediment concentration, two water samples are taken at the beginning and at the end of each transect (see 3.1). Both samples are taken within the range of reliable data of the ADCP. For the near-surface sample this means in bin 3 or 4, for the near-bed sample this means at about one or two meter above the sidelobe.

Water sampling is done together with CTD-OBS measurement in order to have two independent suspended sediment concentration measurements for each sample. OBS measurements were compared to the water samples and recalibrated as mentioned in § 4.1. The water samples were used for Sediview calibration, while cross-calibrated OBS measurements were used as a back up check. The salinity and temperature was used to compute the acoustic water absorption (water attenuation coefficient). All water samples were analysed as is described in 4.2.3.1.

4.2.3. Calibration for suspended sediment concentration within Sediview

4.2.3.1. Calibration workset

The calibration workset consists of ADCP-files, sampling times, sampling depths, SSC obtained from water samples and SSC, temperature and salinity obtained from CTD-OBS readings.

The suspended sediment concentration of the water samples was determined. One-litre samples were filtered over a preweighed desiccated 0.45 micron filter, after which the filter is dried in an oven at 105°C, cooled and weighted (NEN 6484).

4.2.3.2. SSC calibration per ensemble pair

In the Sediview calibration process the following parameters must be defined: the site and instrument constant (Ks), the relative backscatter coefficient (S) and the effective particle size per ensemble-pair (near-surface sample and near-bed sample) in order to fit the Sediview-estimate with the suspended sediment concentration of the water samples. These parameter sets may not differ too much from the previous parameter sets, as the environmental conditions will not change that much over a small time interval. To obtain a smooth progress in time of Ks, S and effective particle size an iterative approach is used.

4.2.4. Sediview configuration

4.2.4.1. Discharge and suspended sediment concentration estimates

The ADCP measures most of the water column from just in front of the ADCP to 6% above the bottom when the beam angle is 20° and to 12% above the bottom when the beam angle is 30°. The shallow layer of water near the bottom is not used to compute discharge and suspended sediment concentration due to side-lobe interference. When the ADCP sends out an acoustic pulse, a small amount of energy is transmitted in side lobes rather than in the direction of the ADCP beam. Side lobe reflection from the bottom can interfere with the water echoes and can give erroneous data. The thickness of the side lobe layer for the ADCP used during this campaign is 12% of the distance from the transducers to the bottom.

Near the banks the water depth is too shallow for the ADCP to profile.

For each of those unmeasured regions, Sediview will make an estimate of the discharges and suspended sediment concentration. The measured and unmeasured regions in the cross section are shown in Figure 4-1 and Figure 4-2.

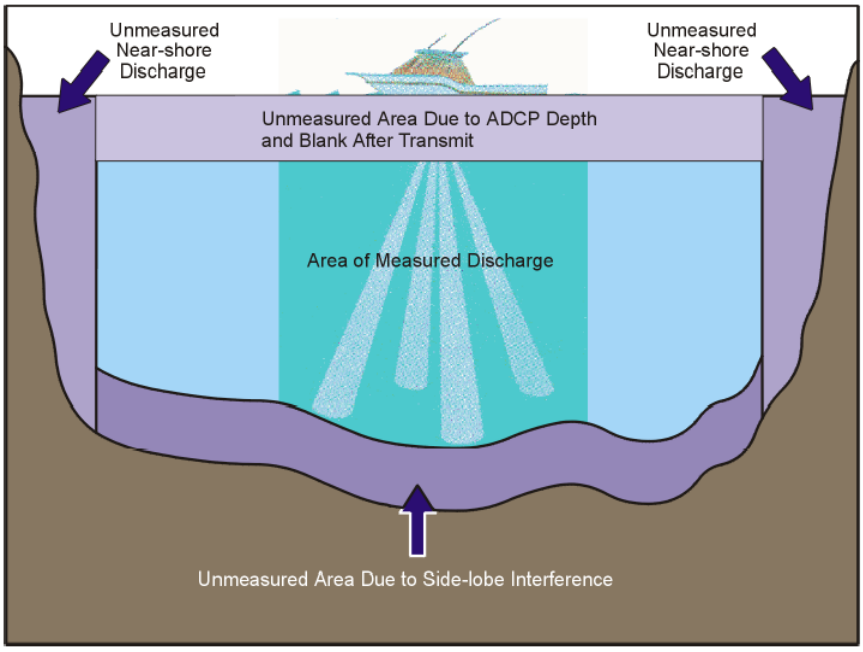


Figure 4-1: Unmeasured regions in the cross section (from RD Instruments, 2003)

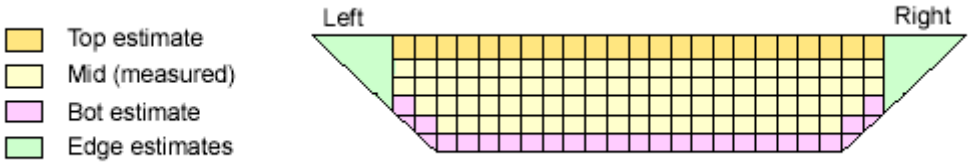


Figure 4-2: Measured and estimated discharges and sediment fluxes within Sediview (DRL, 2005)

4.2.4.1.1 Top/bottom estimates

The sediment concentration and discharge at the top of the water column is assumed to be the same as the concentration and discharge in the first measured bin.

The sediment concentration between the bottom and the lowest valid bin is assumed to be an increase of the lowest valid bin. As the concentration grows approximately linear from the lowest valid bin to the bottom, and as Sediview uses a constant concentration factor for these deepest bins, we use a concentration factor of 125% (Figure 4-3). An overview of the used power concentration factor is given in APPENDIX F.

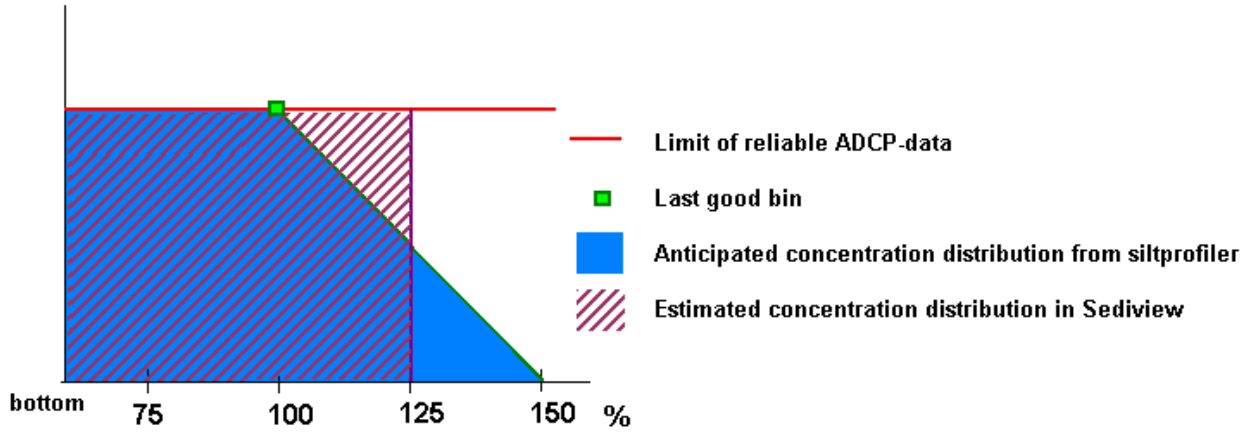


Figure 4-3: Principal of bottom estimate of the sediment concentration in Sediview

Table 4-1: Extrapolation methods for top and bottom variables

Variable	***Top***	***Bottom***
Discharge Method	Constant	Power
Concentration factor	100%	125%

The discharge for the bottom water layer is estimated by using the power method. Chen (1991) discusses the theory of power laws for flow resistance. Simpson and Oltmann (1990) discuss Chen's power law equivalent of Manning's formula for open channels (with b=1/6) (RD Instruments, 2003).

$$u / u* = 9.5(z / z_0)^b$$

Where:

- z = Distance to the channel bed [m]
- u = Velocity at distance z from bed [m/s]
- u* = Shear velocity [m/s]
- z_0 = Bottom roughness height [m]
- b = Exponent (1/6)

4.2.4.1.2 Edge estimates

The shape of the edges of the cross section is assumed to be near rectangular due to the quay walls of the Deurganckdock. Five data ensembles are to be averaged to determine the left and right bank mean velocities used for calculation of edge estimates.

The distance from start- and endpoint to the bank is calculated from the theoretical start- and endpoint at the bank to the effective start- and endpoint. The theoretical points are taken at the banks.

Table 4-2: Reference points at the start of the quaywall on left and right bank

Coordinates (UTM31 ED50)	***Easting Left bank***	***Northing Left bank***	***Easting Right bank***	***Northing Right bank***
Transect DGD	588 541	5 684 527	588 765	5 684 056

The formula for determining the near shore discharge is:

$$Q_{shore} = CV_m Ld_m \text{ [m}^3\text{/s]}$$

Where:

C = Coefficient (0.35 for triangular, 0.91 for rectangular shape)

V_m = Mean water velocity in the first or the last segment [m/s]

L = Distance from the shore to the first or the last segment specified by the user [m]

d_m = Depth of the first or the last segment [m]

The coefficient (C) has been set to 0.91 (rectangular shape of the banks).

4.2.4.2. Contour plots of the transects

All contour plots show perpendicular and parallel projected values on the straightened sailed transects. The heading of the straightened sailed transect is defined by picking 2 points in the straight part of the line after having corrected the heading of the ADCP compass. The compass offset is derived from a comparison of the ADCPs bottom track with the external GPS data.

4.2.5. Output

General transect information containing start-stop coordinates of each sailed transects with stop time, track length and heading is given in APPENDIX A.

In APPENDIX G, four contourplots were generated for each transect showing the distribution of suspended sediment concentration & sediment flux as well as the flow velocity perpendicular and parallel to the transect. The following conventions were used:

- Distances on the X-axis were referenced to the starting point of the transect, the start of the sailed transect is always at distance equal to zero.
- Left bank is always shown left, right bank on the right side. For transect DGD, left bank was taken to be the western quay wall and the right bank to be the eastern quay wall considering the dock as being a tributuary to the Scheldt river.
- Perpendicular flow velocities and fluxes are positive for downstream flow (ebb, out of Deurganckdok), negative for upstream flow (flood, inbound).
- Parallel flow velocities are positive for flow going from the left bank to the right bank, and negative for flow going from the right bank to the left bank.
- Absolute Depth is given in meters above TAW.

Also a depth-averaged velocity plot was generated for the flow velocity perpendicular to the transect. (see APPENDIX G).

Tables in APPENDIX H give the values for discharges and sediment fluxes for the total cross-section and the average measured SSC is shown in APPENDIX I.

- Mid = measured part of the cross-section
- Top = top part of the cross-section
- Bottom = bottom part underneath the sidelobe
- Edge (left, right) = edge estimates to left & right bank
- Total = Mid+Top+Bottom+ Edge values

The graph in APPENDIX J gives the temporal variation of the total flux, total discharge and total measured SSC for the whole through tide measurement at Deurganckdok.

5. PRELIMINARY ANALYSIS OF THE DATA

5.1. June 26th 2008 survey

As Deurganckdok is situated along the part of the Scheldt river under tidal influence, it is subject to complex current fields near its entrance. The measured current field shows a vortex pattern depending on the tidal phase. During ebbing tide the vortex at the entrance of the dock is a counter-clockwise one and during rising tide it is a clockwise one. This is shown in the contour plots by inflow (negative) on the western side (left) and outflow on the eastern side of the entrance during ebbing tide and vice versa for flooding tide. (APPENDIX G).

During slack water we see a current field with opposing current directions in the upper part of the water column compared to the lower part of the water column. For high water, there is an inflow (negative) near the bottom and outflow (positive) near the surface. This particular pattern is probably an example of the expected salt density currents occurring near the entrance of Deurganckdok. The same event is seen at low water when the dock contains waters of higher salinity than the river; here we see an outflow near the bottom and inflow near the surface.

From the backscatter interpretation into suspended sediment concentration, one can notice in general a higher concentration during slack water and during rising tide compared to during ebb tide.

Considering the sediment fluxes APPENDIX J shows that incoming transport is dominating during flood while a residual outgoing sediment transport can be observed from HW until LW.

It appears from the recorded data that the highest water velocities occur near the navigation channel at about 1 hour before HW in which velocities exceed 1 m/s. The total calculated discharge over a cross-section ranges between -287 and 874 m³/s.

The depth-averaged suspended sediment concentrations range from 18 mg/l up to 103 mg/l. The highest SS concentrations occur around HW.

The maximum calculated flux during ebb occurs 0h20 before HW and is about 18 kg/s. During flood, the highest flux is about -29 kg/s, 2h33 before HW. So the maximal influx and the maximal outflux occur both before HW. Their magnitude is within the same range, which is in contrast to the measurements of 19/06/2008

5.2. Intercomparison with earlier surveys at DGD

Since 2005, IMDC has organised several through tide measurement campaigns at the entrance of Deurganckdok. The course and results of the campaigns were described in IMDC rapports and are listed in Table 5-1. Table 5-1 gives also an overview of the tidal phase during the campaigns. Conditions near the entrance of Deurganckdok have been simulated in Delft3D and processed by IMDC (2006n) in order to compare simulation with observed data.

5.2.1. Fresh water discharges

The fresh water discharges at Schelle were calculated from the tributaries, which were recorded during the measurement campaigns. The calculation procedure is described in AZ (1974) and is based on the use of correction coefficients that take in account the surface of the hydrological basins. The daily fresh water discharges at Schelle are listed in Table 5-1. The evolution of the fresh water discharge at Schelle for all former campaigns is shown in Figure 5-1.

The results presented in Figure 5-2 are based on a long-term simulation over a period of 30 year (1971-2000) with the SIGMA-model for MKBA (IMDC, 2006r). The mean discharge is the annual average ten days' discharge, calculated with simulated long-term measurements. The high and low discharges are also annual ten days' discharges, and are calculated as mean discharge +2σ and mean discharge -2σ.

Table 5-1: Hydrological conditions during through tide ADCP measurements at the entrance of DGD

Tidal Coefficient at tidal gauge: Liefkenshoek				
PROJECT (DESCRIPTION)	***Date***	***Tidal coefficient***	***Tidal phase***	***Daily fresh water discharge at Schelle [m³/s]***
HCBS 1 (IMDC, 2006m)	17/11/2005	1.10	Spring	91
HCBS 2 (IMDC, 2006c)	22/03/2006	0.97	Average	94
HCBS 2 (IMDC, 2007o)	27/09/2006	1.03	Average	33
DGD 1 (IMDC, 2008a)	24/10/2007	1.02	Average	46
DGD 2 (IMDC, 2008k)	11/03/2008	1.17	Spring	286
DGD 3 (IMDC, 2008u)	19/06/2008	1.15	Spring	27
DGD 3 (IMDC, 2008v)	26/06/2008	0.97	Average	20

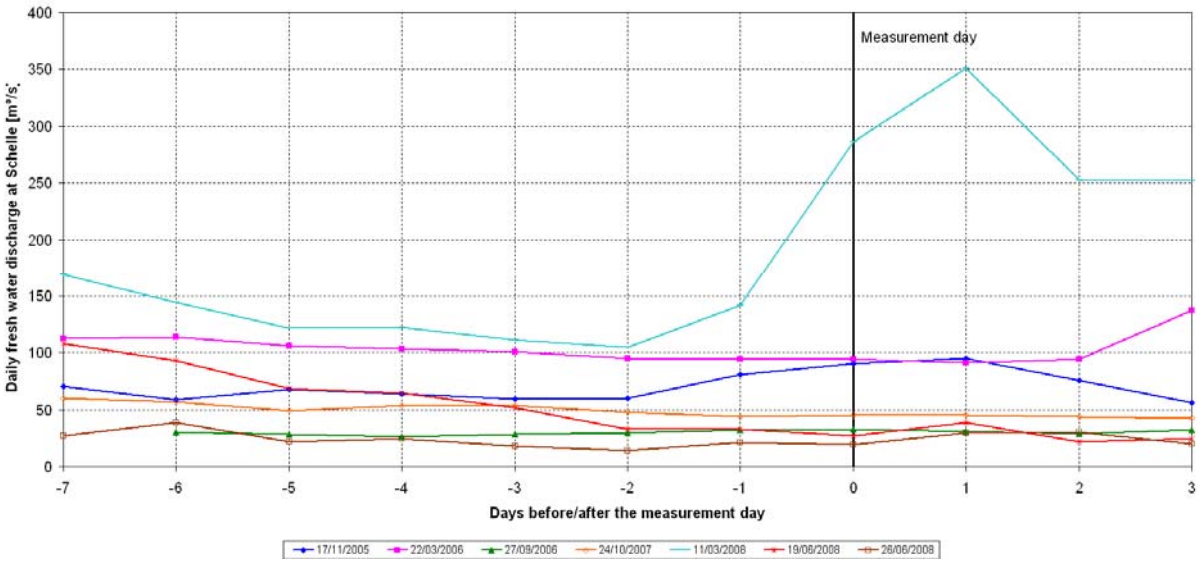


Figure 5-1: The daily fresh water discharge evolution at Schelle before and after a measurement day.

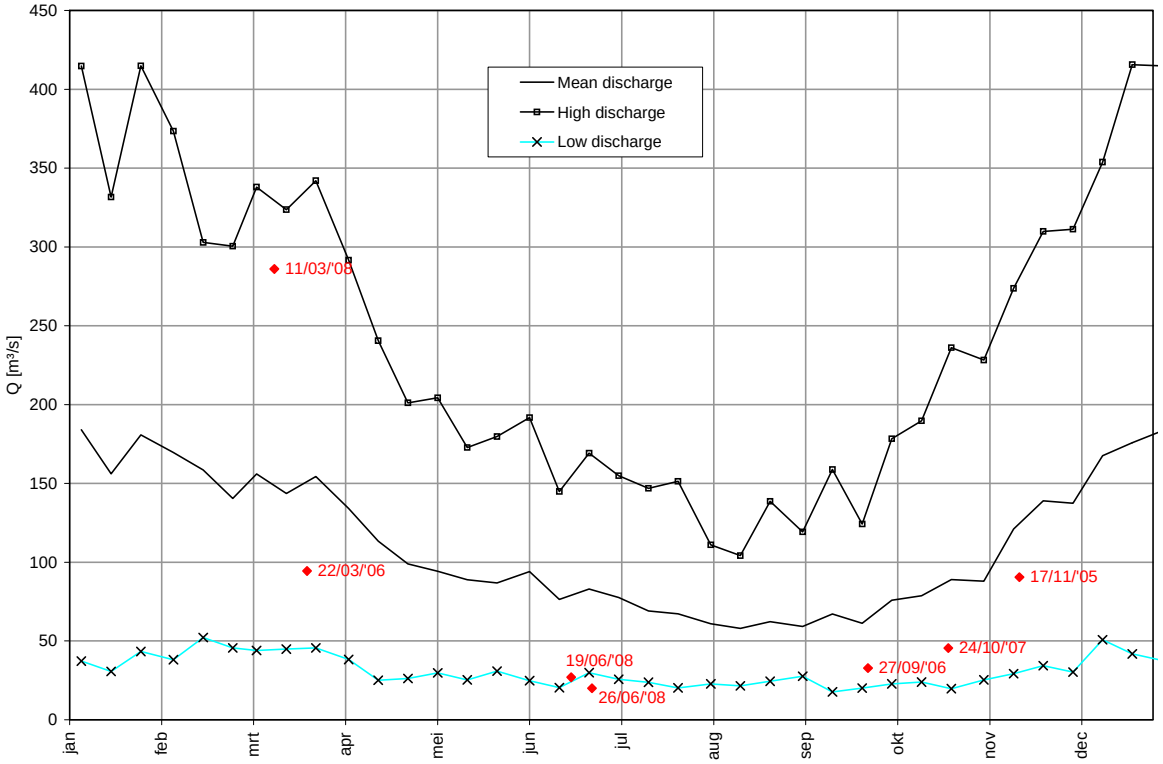


Figure 5-2: Mean fresh water discharge

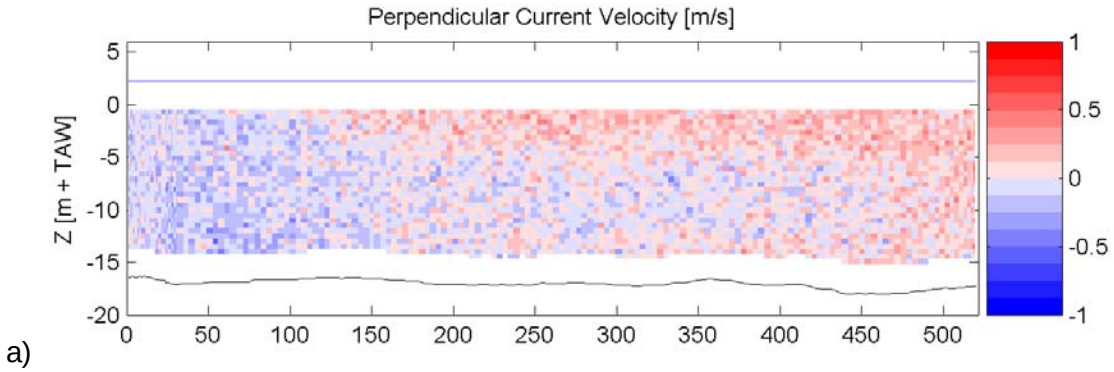
5.2.2. Sediment distributions and current pattern around HW

In Figure 5-3 and Figure 5-4 the seven different measurement campaigns have been compared for about 3h after high water. Sediment distributions as well as current pattern in the cross section are almost identical for the former campaigns. The western side of the dock is situated at the left of these figures, the eastern side at the right.

In Figure 5-5 and Figure 5-6 the circulation pattern and sediment concentration have been compared for the same days but at about 1h after high water. Again the current pattern is almost identical between the different days with a salt wedge intruding near the bottom of the dock and compensatory outflow of fresher water near the surface. Except for the measurements at 11/03/2008, the sediment distributions are very similar between the different campaigns.

The measurements around HW on 11/03/2008 show a different sediment distribution compared to the other measurement days. The sediment concentrations are considerably higher and this almost throughout the whole water column. These high concentrations can also be seen on the surrounding transects on 11/03/2008, so it is very unlikely these concentrations can be attributed to a shipwake.

These high concentrations must slightly be attributed to the high fresh water discharges, recorded on 11/03/2008 near Schelle (see Figure 5-2), but most particular to the extreme spring tide. Compared with the other tides, the waterlevel at 11/03/2008 increases slower during the first hours of the flood. As a result, there is a huge intake of water during the second part of the flood phase. It is during these last hours of the flood, that those high concentrations were measured.


Perpendicular Current Velocity [m/s]
Z [m + TAW]
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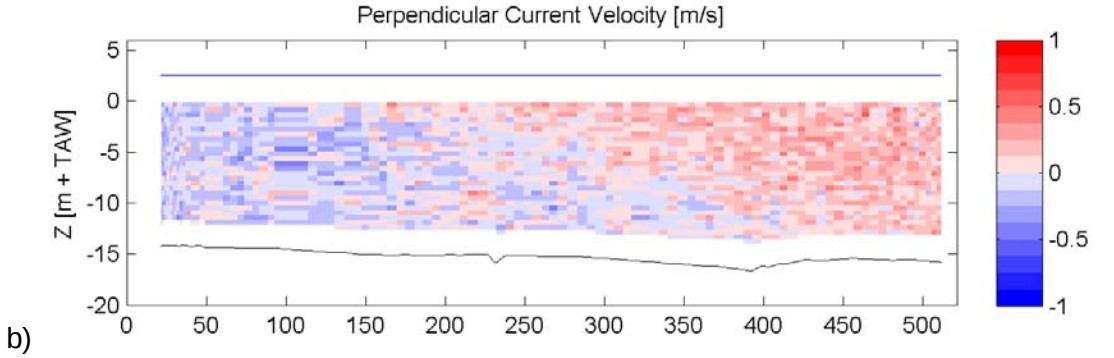
a)


Perpendicular Current Velocity [m/s]
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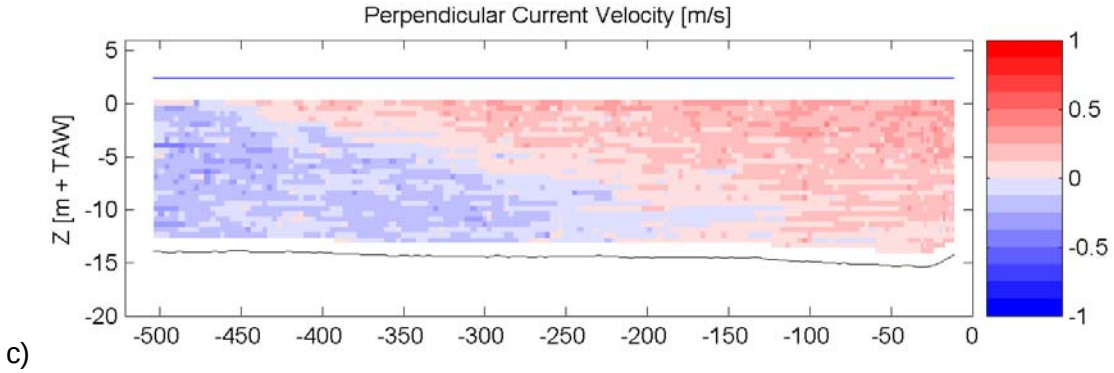
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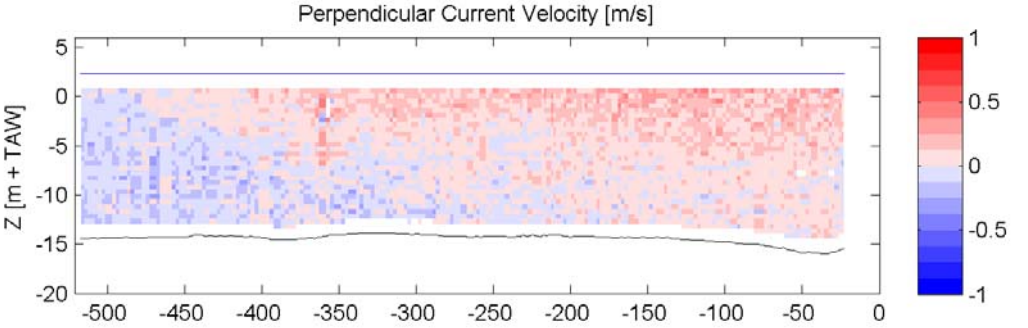
Perpendicular Current Velocity [m/s]
Z [m + TAW]
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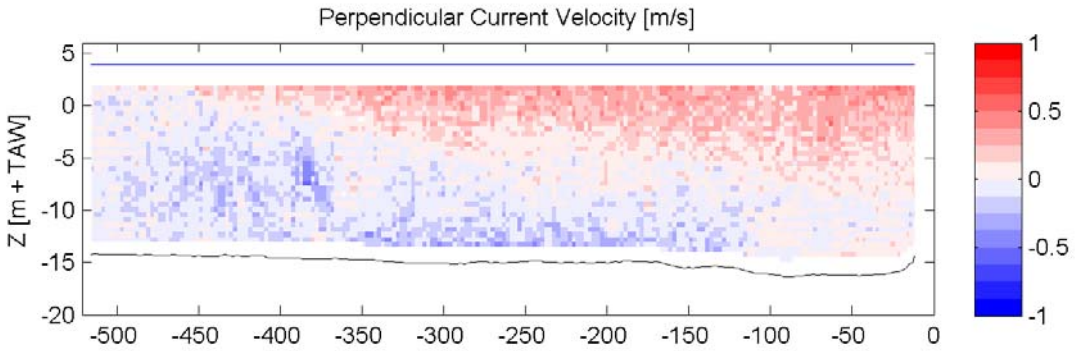

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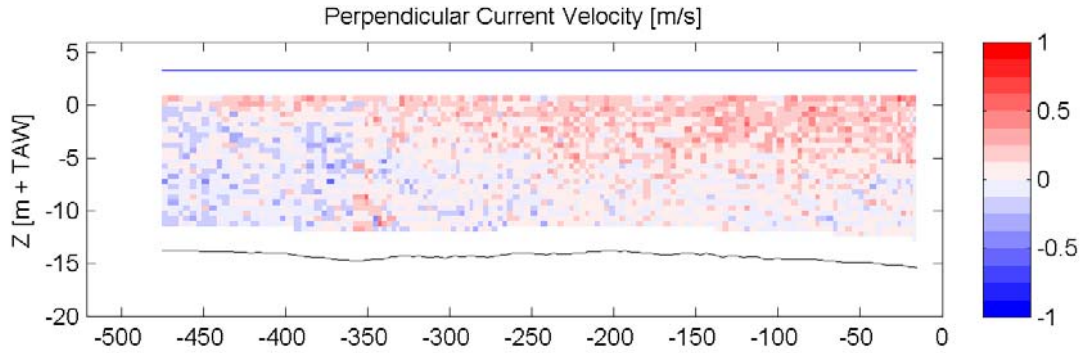

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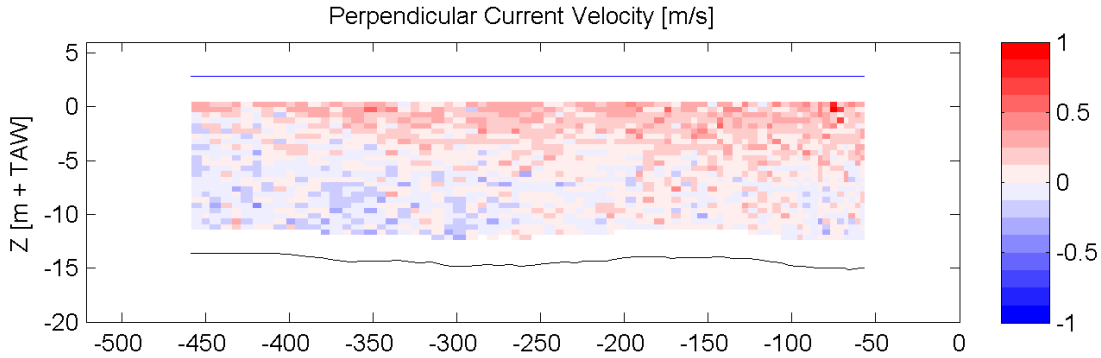
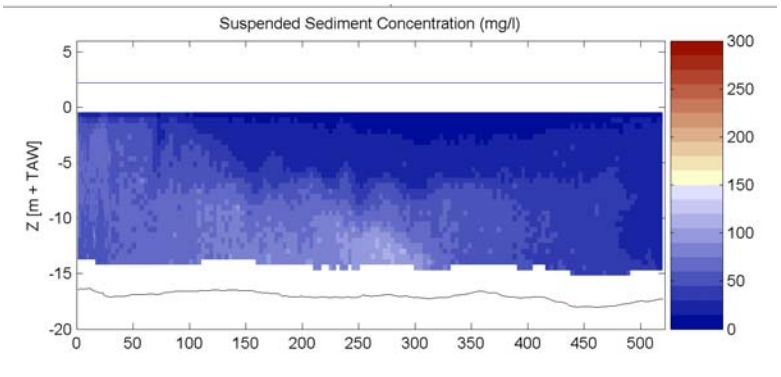


g)

Figure 5-3: a) Perpendicular current velocity on 17/11/2005, b) on 22/03/2006, c) on 27/09/2006, d) on 24/10/2007, e) on 11/03/2008, f) on 19/06/2008 and g) on 26/06/2008 at 3h after high water

a)


Suspended Sediment Concentration (mg/l)
Z [m + TAW]
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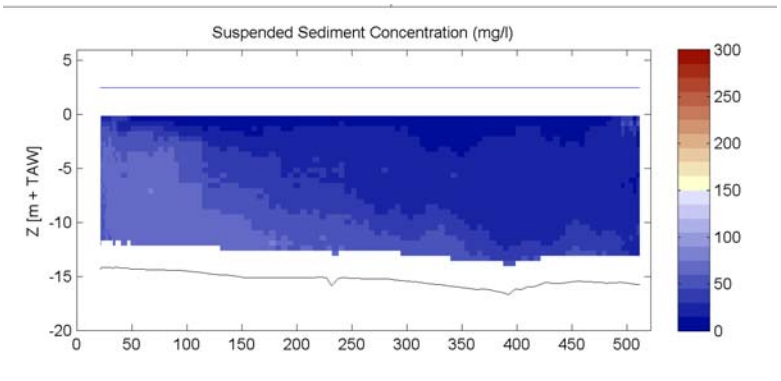
b)


Suspended Sediment Concentration (mg/l)
Z [m + TAW]
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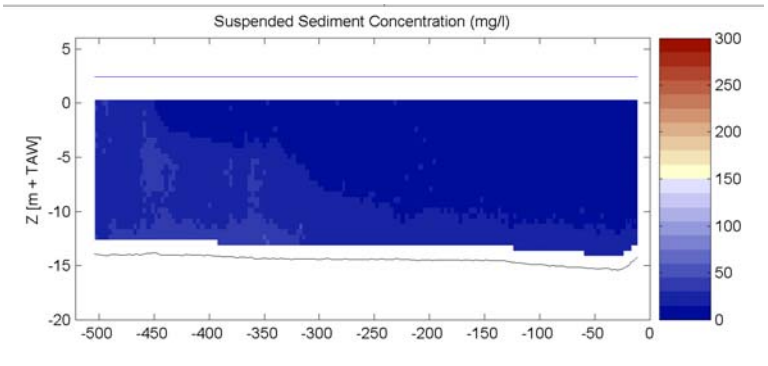
Suspended Sediment Concentration (mg/l)
Z [m + TAW]
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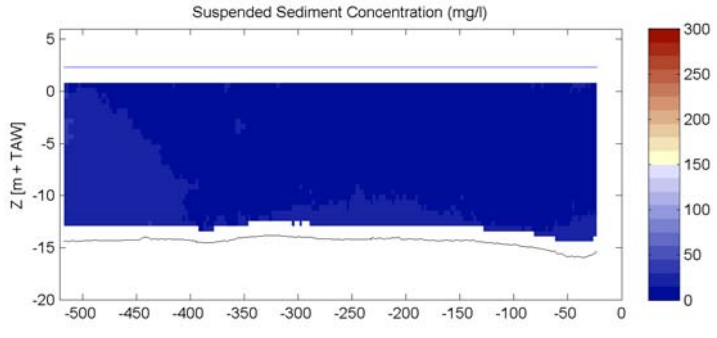
Suspended Sediment Concentration (mg/l)
Z [m + TAW]
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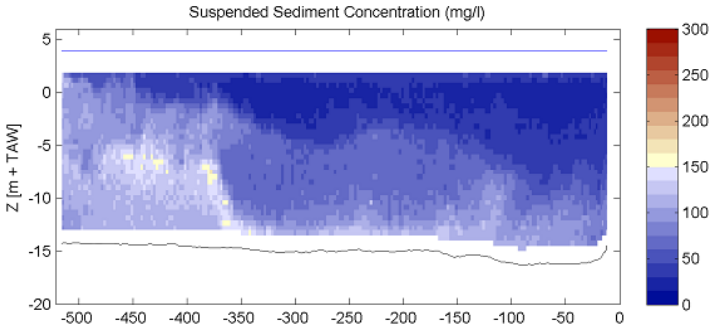

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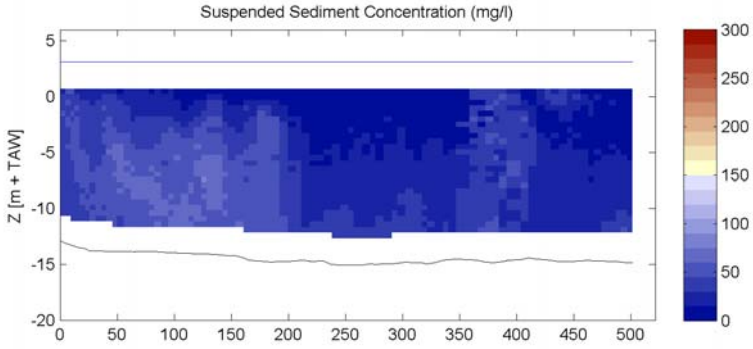

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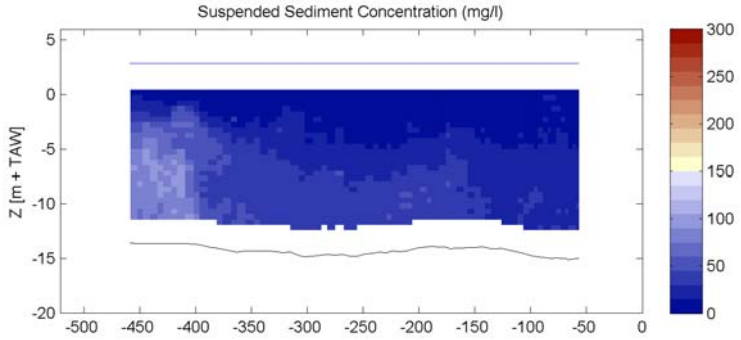

g)

Figure 5-4: a) Suspended sediment concentration on 17/11/2005, b) on 22/03/2006, c) on 27/09/2006, d) on 24/10/2007, e) on 11/03/2008, f) on 19/06/2008 and g) on 26/06/2008 at 3h after high water

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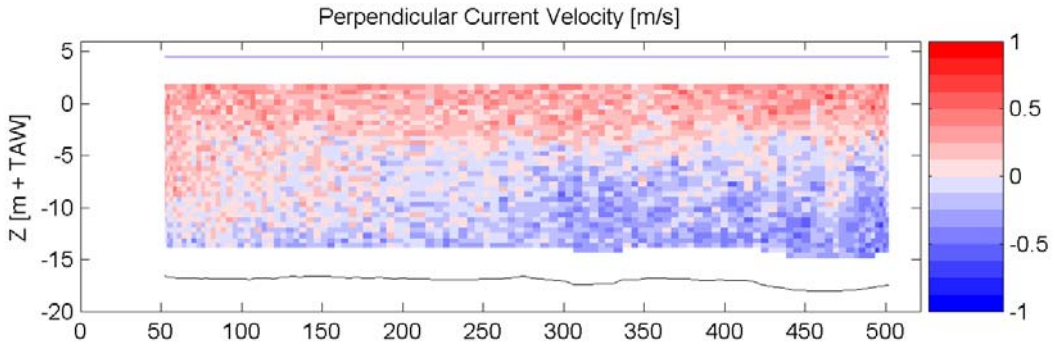
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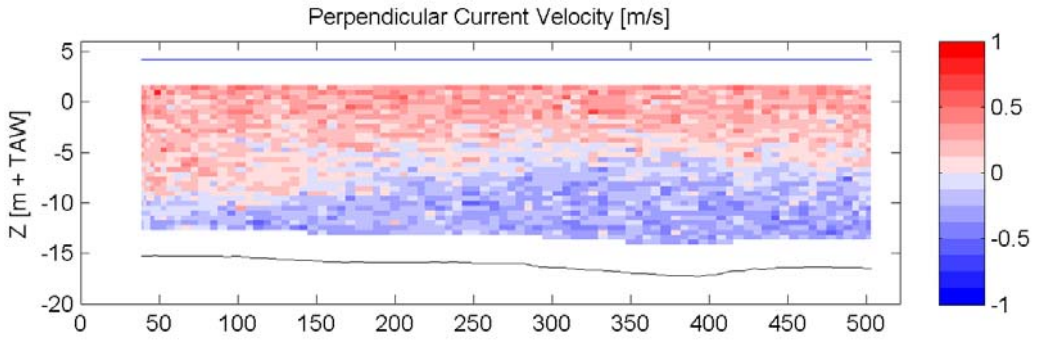
b)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Z [m + TAW]
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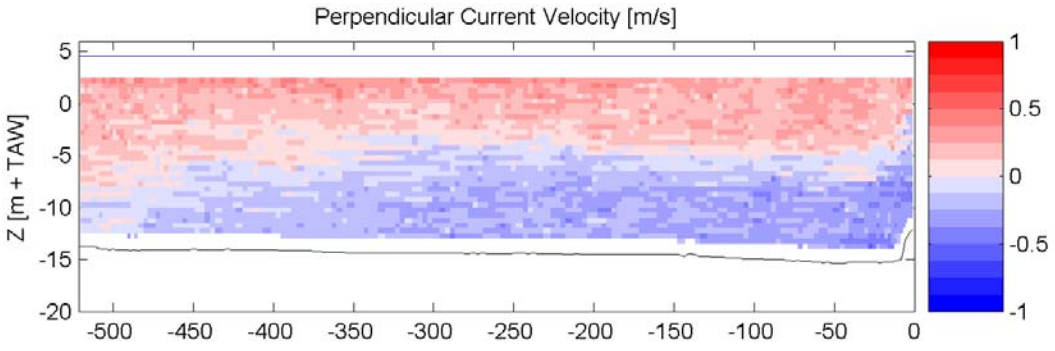
Perpendicular Current Velocity [m/s]
Z [m + TAW]
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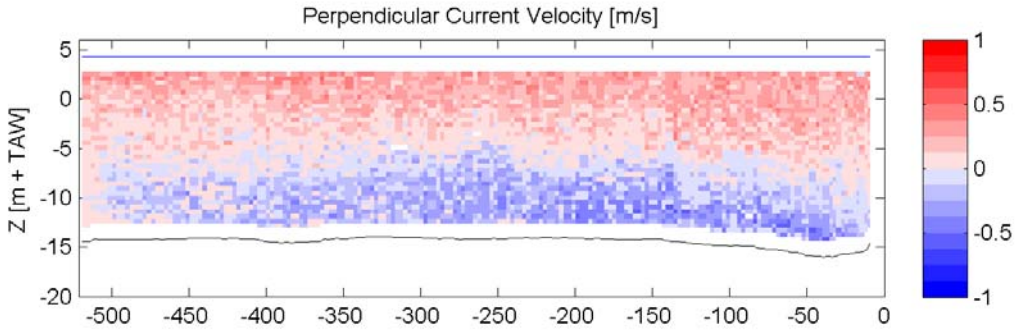
d)


Perpendicular Current Velocity [m/s]
Z [m + TAW]
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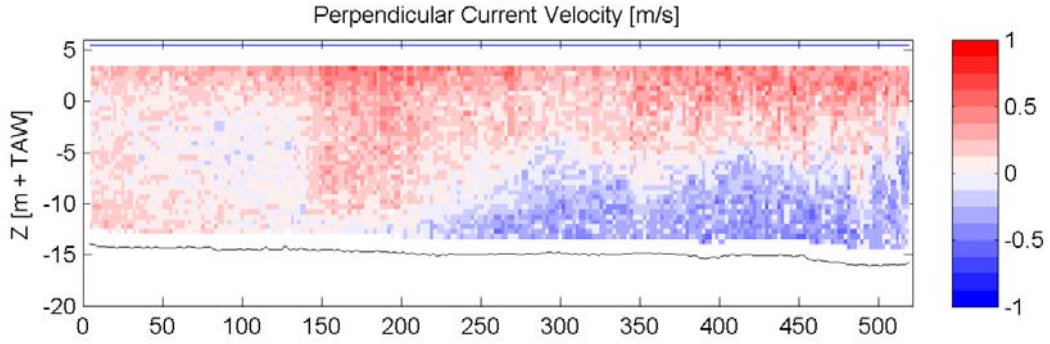

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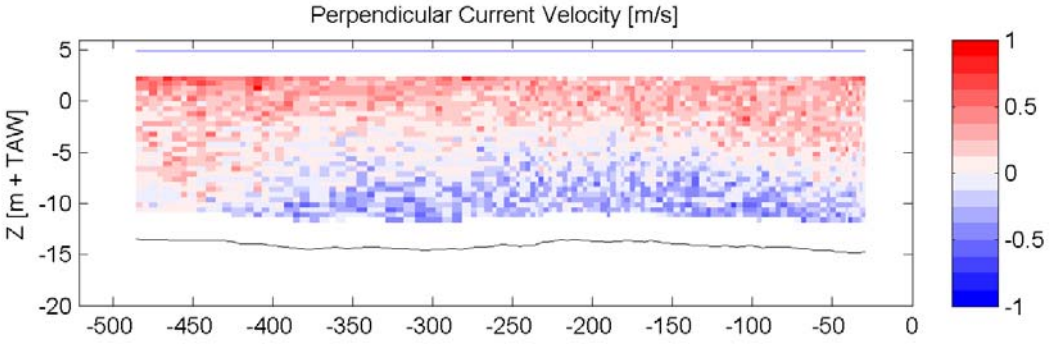

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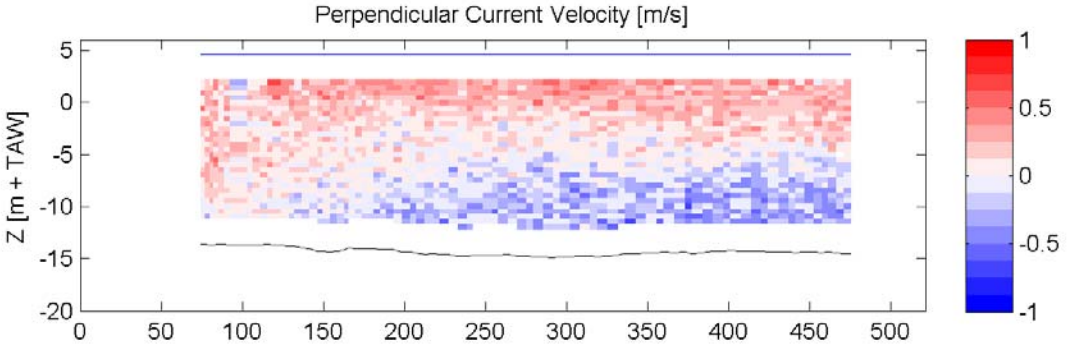
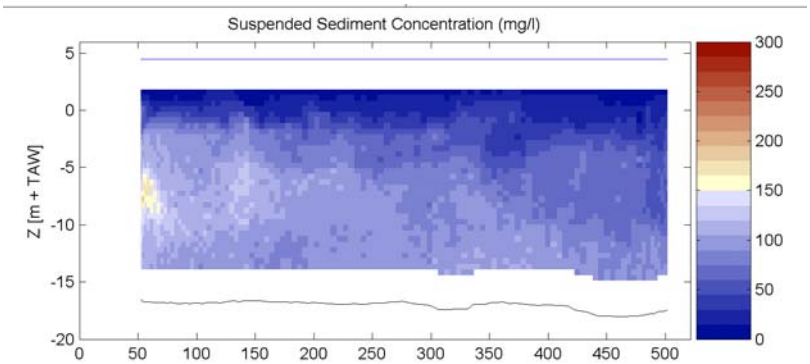


g)

Figure 5-5: a) Perpendicular current velocity on 17/11/2005, b) on 22/03/2006 , c) on 27/09/2006, d) on 24/10/2007, e) on 11/03/2008, f) on 19/06/2008 and g) on 26/06/2008 at 1h after high water

a)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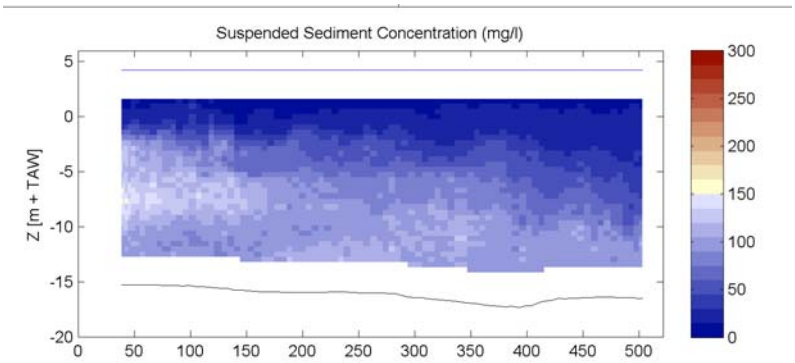
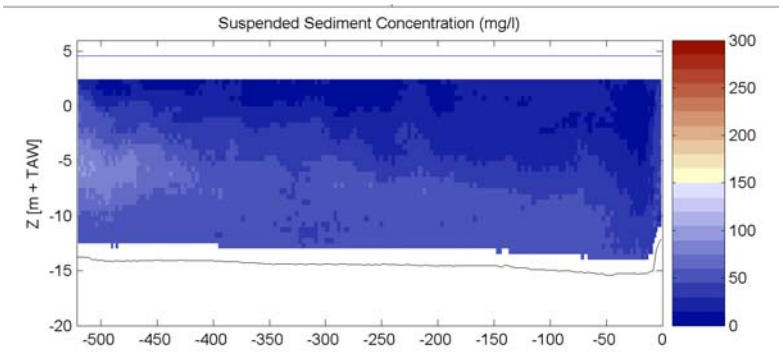
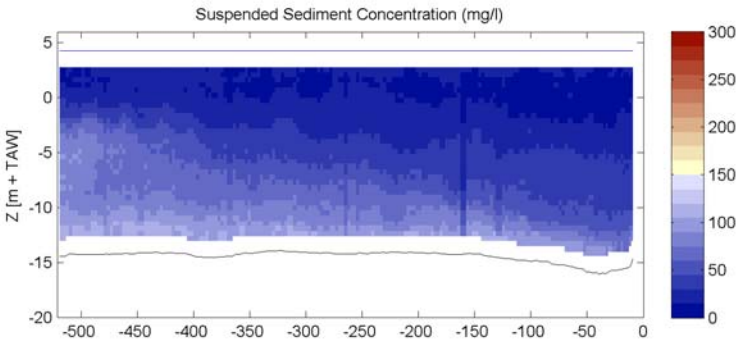
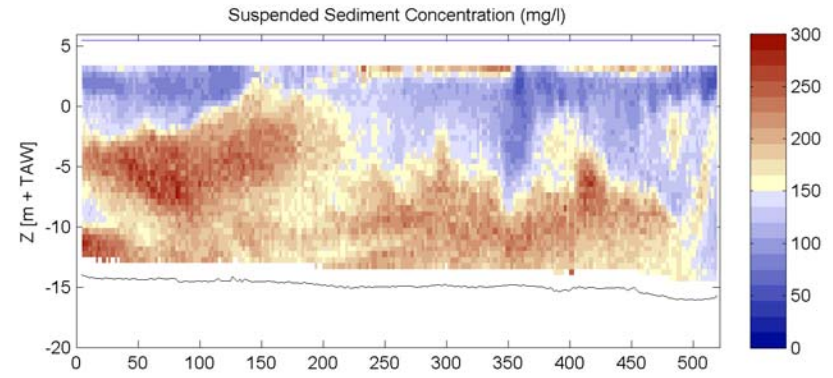

Suspended Sediment Concentration (mg/l)
Z [m + TAW]
5
0
-5
-10
-15
-20
0
50
100
150
200
250
300
350
400
450
500
300
250
200
150
100
50
0

c)

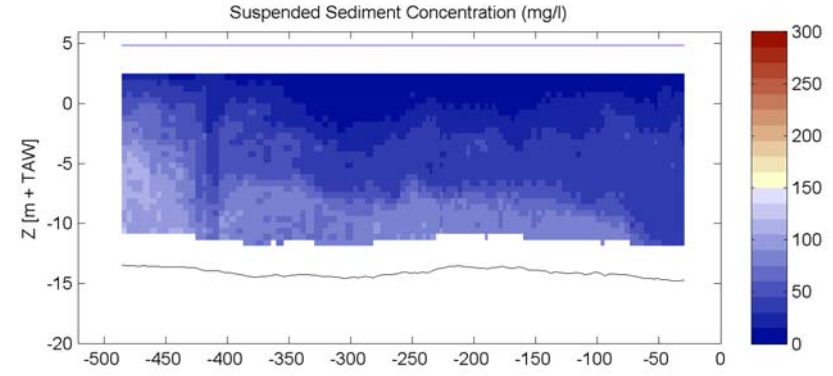

Suspended Sediment Concentration (mg/l)
Z [m + TAW]
5
0
-5
-10
-15
-20
-500
-450
-400
-350
-300
-250
-200
-150
-100
-50
0
300
250
200
150
100
50
0

d)

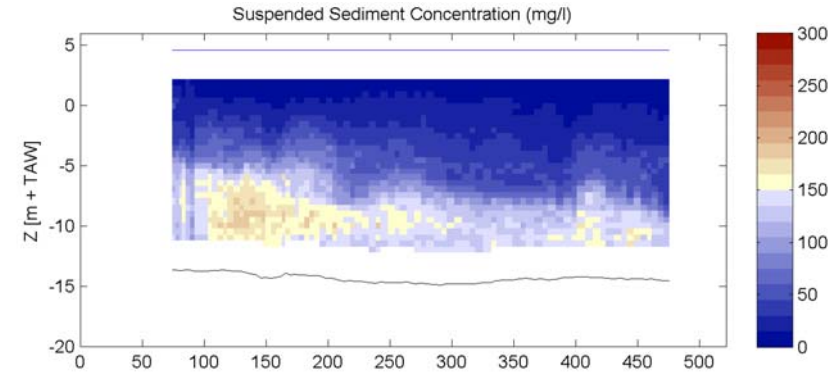

Suspended Sediment Concentration (mg/l)
Z [m + TAW]
5
0
-5
-10
-15
-20
-500
-450
-400
-350
-300
-250
-200
-150
-100
-50
0
300
250
200
150
100
50
0



e)



f)



g)

Figure 5-6: a) Suspended sediment concentration on 17/11/2005, b) on 22/03/2006 , c) on 27/09/2006, d) on 24/10/2007, e) on 11/03/2008, f) on 19/06/2008 and g) on 26/06/2008 at 1h after high water

5.2.3. Water balance

The volume of water, crossing the dock's entrance during flood or ebb on a measurement day, was calculated by integrating the discharge curve during flood and ebb respectively (see Figure 5-7 & Table 5-3). During flood on the 26th of June 2008, 1 994 000m³ water crossed the entrance and during ebb 12 260 000 m³. Similar to the previous campaign of 19/06/2008 (IMDC, 2008u), the water balance doesn't match. Compared with the theoretical expected

estimates, the measurements have an unnatural high volume of water during ebb (in particular the first 2 hours after slack water). See Table 5-3 & Figure 5-7.

Like on 19/06/2008, the main reason for this overestimation can be found in the estimations of the unmeasured regions (the bottom, top and edge estimations). An ADCP cannot measure a complete cross section. Near the banks, near the bottom and near the water surface, no measurements are possible and the discharge in these unmeasured areas needs to be estimated (see 4.2.4.1). During this campaign, the average percentage of the cross-section that was really measured is 65% (see Table 5-2) The remaining 35% of the cross section had to be estimated.

Table 5-2 Average percentage of the different area's to the total cross section area

Amid/Atot	Aleft/Atot	Aright/Atot	Atop/Atot	Abot/Atot
65%	**8%**	**3%**	**15%**	**9%**

To exclude the errors caused by these estimations, the effective measured discharge (Q_{mid}) and the discharge from the different estimations (Q_{top} for the near water surface, Q_{bot} for the near bottom, Q_{left} for the left bank and Q_{right} for the right bank) on 26/06/08 are shown in Figure 5-9.
During most parts of the tide, the largest share of the total discharge is not represented by Q_{mid}, but by Q_{top}, Q_{left} or Q_{right}. As a result the presented water volumes are only for a small part measured (see Figure 5-12 and Table 5-4).

Compared with the former campaigns, the effect of the estimates seems to be larger. Perhaps, this can be explained partly as a result of the boat setup and the ADCP.

- The uncertainty on the top estimated values is increased since the transducer depth of the ADCP was lowered from 1.4 meter (setup on the Parel II) to 1.8 meter (setup ADCP on the Scheldewacht).
- The uncertainty on the bottom estimated values for the measurements of 17/11/2005, 22/03/2006 and 19/06/2008 is twice as big because of the beam angle of the ADCP. In these measurements, the beam angle of the ADCP was 30°, therefore, the area near the bottom that is not be measured is 12% (see 4.2.4.1). During the other measurements, the ADCP had a beam angle of 20°, which implements a much smaller unmeasured area of 6%. The velocities/discharges in these unmeasured areas are estimated in the bottom estimates by means of a power extrapolation (4.2.4.1.1). The bottom estimates of the campaigns measured by an 30° beam angle ADCP are therefore an underestimation of the real discharge.

To cancel the effect of the estimations, the Q_{mid} for the different measurement campaigns are presented in Table 5-3. From this figure, it appears that the differences between the Q mid of the different campaigns are smaller than when the Q_{tot} are considered. Also the variation between 2 single successive measurements of the same campaign has grown smaller (see Figure 5-12). This effect is more pronounced for the latest measurements, which were measured on a higher frequency (5 to 6 measurements per hour).

A similar conclusion can be drawn from Figure 5-12, where the Q measured (Q_{mid}) is compared with the theoretical discharge (estimated from the tide difference and the surface area of DGD). During ebb, there is only a small difference between both curves. During flood, the inflow is underestimated, but still follows a similar trend.

As a conclusion, it appears that the total water balance doesn't fit well. The main cause for this unbalanced balance is the uncertainty/accuracy of the estimations, which appears to have a rather big influence on the total water volume (Table 5-3). Near the future, it is important on one hand to minimize these estimates as much as possible by starting and ending the transects close to the quay walls, by minimising the transducer depth and by using an ADCP with a beam angle of 20° in stead of 30°. On the second hand, it is important to increase the accuracy of these estimations. Finally, it is important to maintain the high frequency of sailed transects to reach a smooth curve of the Q_{mid}.

5.2.4. Sediment balance

The mass of the suspended sediment, crossing dock's entrance during flood or ebb on a measurement day, was calculated on a similar manner as the volume. So the conclusions are same as those mentioned above in the water balance.

The flux curve was integrated (Figure 5-11) and the results are shown in Table 5-4. Based on ADCP measurement and Sediview estimations, on the 26th of June 2008 75 tonnes SS was crossing the entrance during ebb and during flood 182 tonnes. 107 tonnes SS was deposited in the dock during the tidal cycle. Considering only the measured part of the cross-section 201 tonnes was deposited with influxes during flood and ebb of 82 and 119 tonnes Comparing to other campaigns, 107 or 201 tonnes is a rather low average

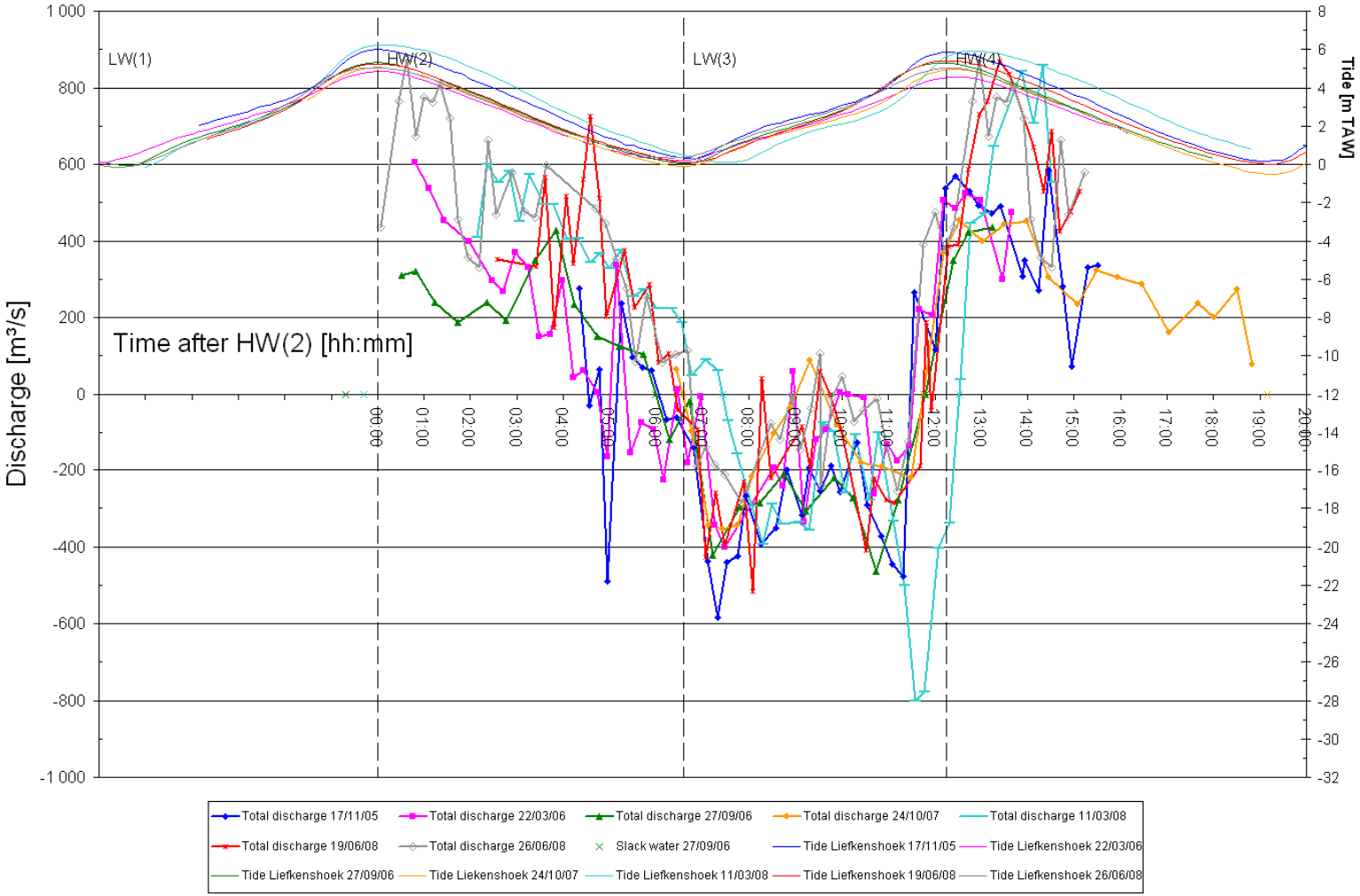


Figure 5-7: Total discharge, with Sediview's estimates, on 17/02/2005 (Neap tide), 22/03/2006 (Neap tide), 27/09/2006 (Average tide), 24/10/2007 (Average tide), 11/03/2008 (Spring tide), 19/06/08 (Average tide) & 26/06/08 (Average tide and theoretical discharge)

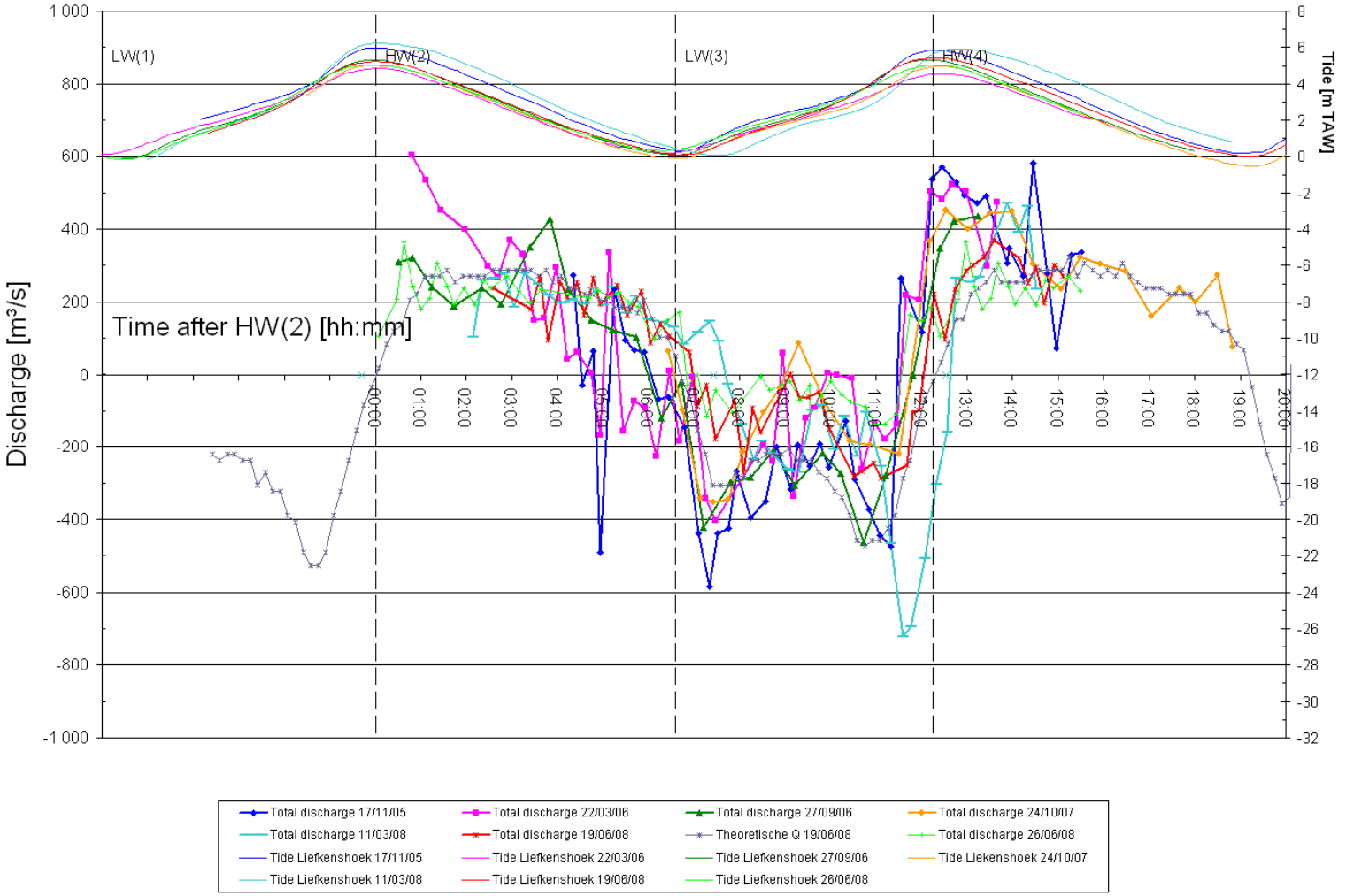


Figure 5-8 Total discharge without Sediview's estimates on 17/02/2005 (Neap tide), 22/03/2006 (Neap tide), 27/09/2006 (Average tide), 24/10/2007 (Average tide), 11/03/2008 (Spring tide), 19/06/08 (Average tide) & 26/06/08 (Average tide and theoretical)

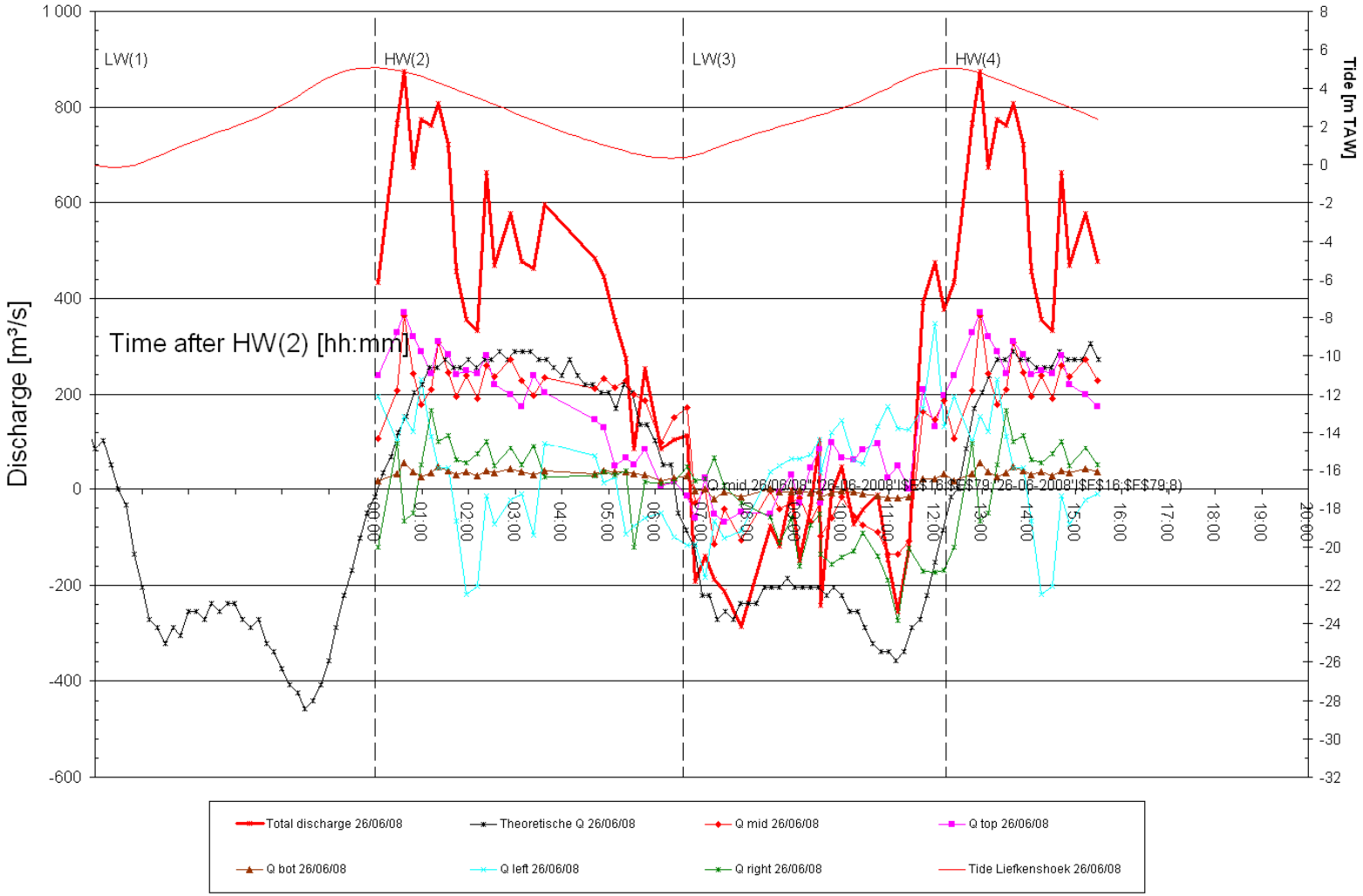


Figure 5-9: Sediview's total discharge (Qtot) based on measured discharge (Qmid) and estimates for top (Qtop), bottom (Qbot), left side (Qleft) and right side (Qright), compared to theoretical expected total discharge (Qtheo) on 26/06/08 (Average tide)

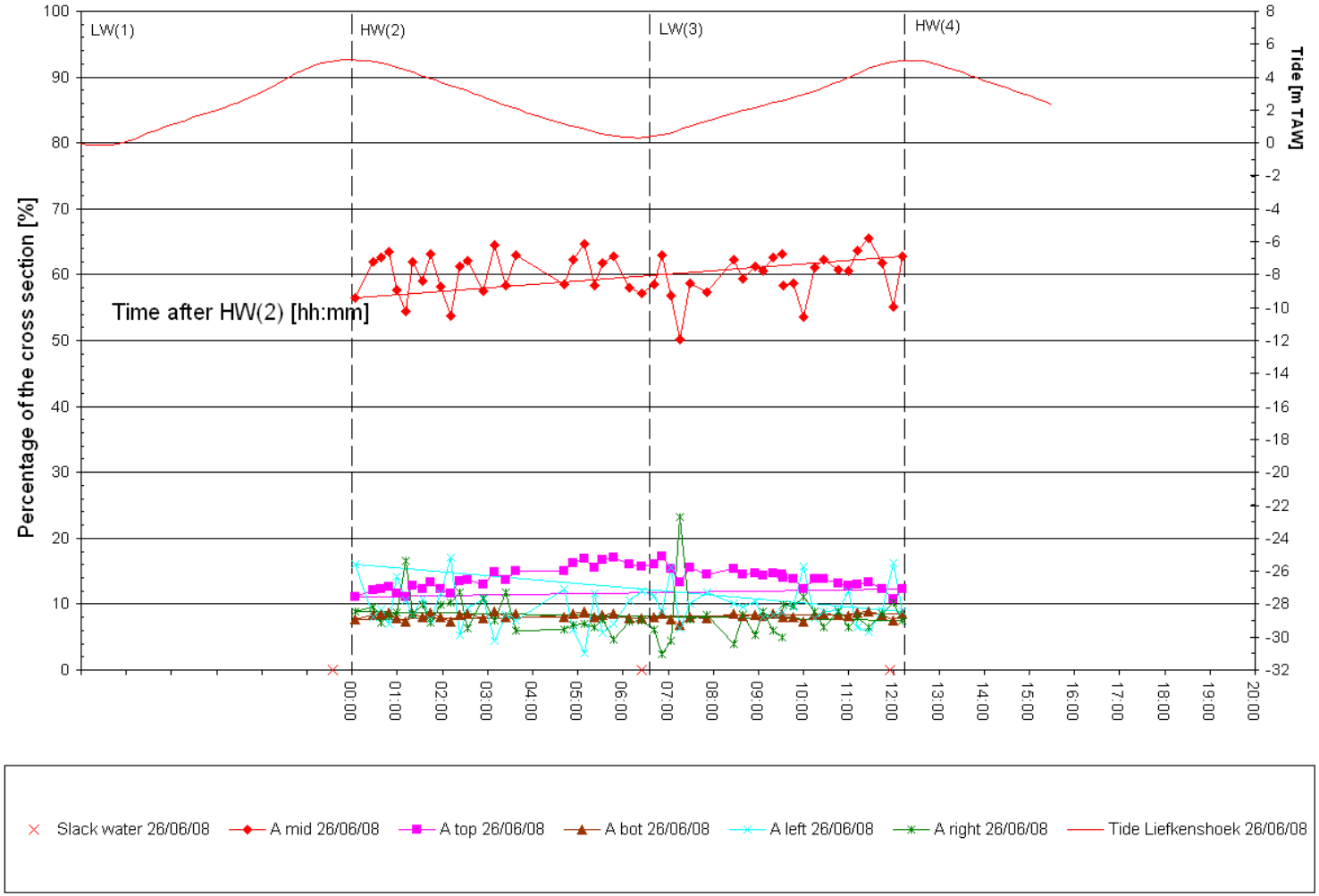


Figure 5-10 Percentage of the cross section area for measured discharge (Qmid) and estimates (Qtop, Qbot, Qleft & Qright) in relation to the total cross section area, for measurement day 26/06/08 (Average tide)

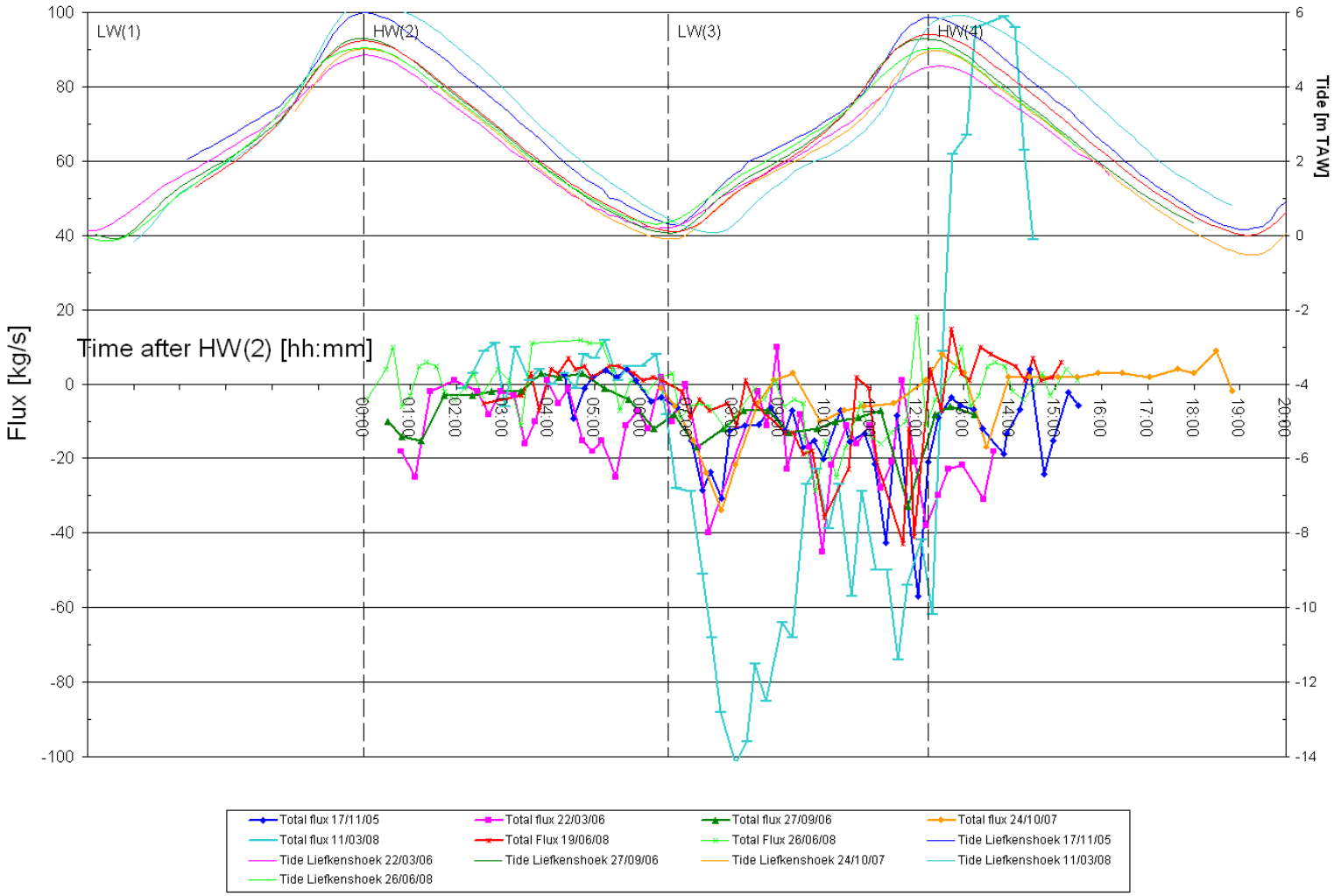


Figure 5-11: Total flux on 17/02/2005 (Neap tide), 22/03/2006 (Neap tide), 27/09/2006 (Average tide), 24/10/2007 (Average tide), 11/03/2008 (Spring tide), 19/06/08 (Average tide) & 26/06/08 (Average tide)

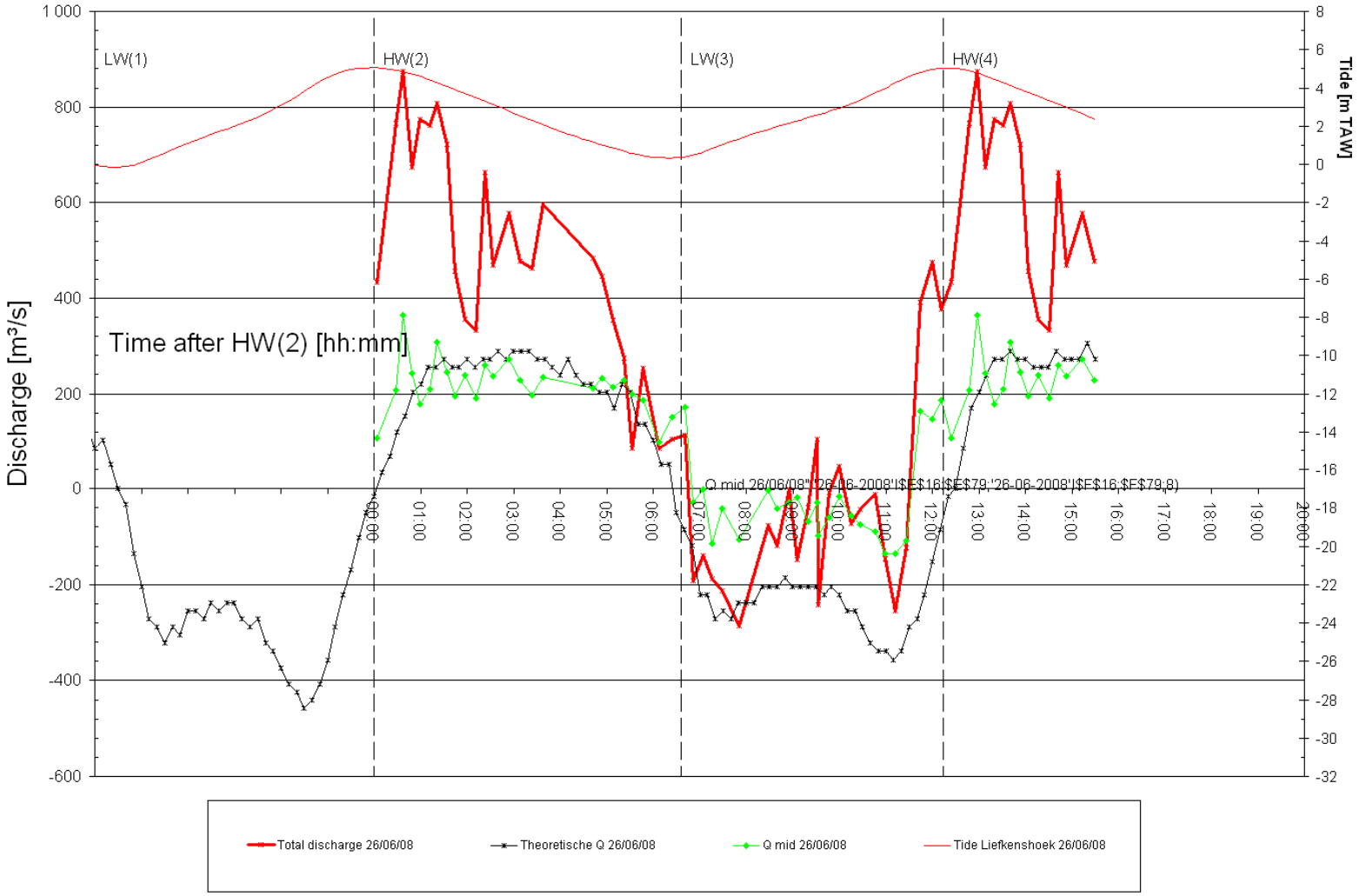


Figure 5-12 Total discharge, measured discharge and theoretical discharge on 19/06/08 (Average tide)

Table 5-3: Water volume during ebb, flood and measurement campaign on 17/11/2005 (Spring tide), 22/03/2006 (Neap tide), 27/09/2006 (Average tide), 24/10/2007 (Average tide), 11/03/2008 (Spring tide), 19/06/08 (Average tide) & 26/06/08 (Average tide), including theoretical expected volumes (Vol_{Est}) and volumes with Sediview's estimates (Vol_{Tot}) and without estimates (Vol_{Mid}). The durations are based on ADCP measurements (T_{ADCP}) and tidal data at gauge Liefkenshoek (T_{Lief}).

Measurement Day		***17/11/05***	***22/03/06***	***27/09/06***	***24/10/07***	***11/03/08***	***19/06/08***	***26/06/08***
Ebb	Vol_{Tot} [1000xm³]	6 620	7 122	5 914	7 649	11 872	10 886	12 260
	Vol_{Mid} [1000xm³]	2 269	2 810	1 785	5 091	5 806	5 585	6 100
	T_{ADCP} [HH:MM]	6:50	6:20	6:40	7:24	7:44	6:49	7:00
	Vol_{Est} [1000xm³]	4 276	3 511	3 946	5 592	6 254	5 225	4828
	T_{Lief} [HH:MM]	6:50	6:20	6:40	6:30	7:30	6:40	6:20
	Vol_{Mid} / Vol_{Tot} [%]	34	39	30	67	49	51	50
	Vol_{Mid}/ Vol_{Est}[%]	53	80	45	98	93	107	126
	Tidal Difference [m]	5.7	4.68	5.26	5.49	6.14	5.13	4.74
Flood	Vol_{Tot} [1000xm³]	-5 558	-3 517	-5 224	-2 865	-5 642	-3 778	-1 994
	Vol_{Mid} [1000xm³]	-3 252	-2 263	-3 238	-1 878	-4 648	-2 689	-1 259
	T_{ADCP} [HH:MM]	5:24	6:10	5:48	5:11	5:05	5:30	5:19
	Vol_{Est} [1000xm³]	-4 186	-3 286	-3 931	-5 154	-5 959	-5 409	-5 042
	T_{Lief} [HH:MM]	5:20	6:10	5:30	5:50	5:40	5:40	6:00
	Vol_{Mid} / Vol_{Tot} [%]	59	64	62	66	82	71	63
	Vol_{Mid}/ Vol_{Est}[%]	78	69	82	36	78	50	25
	Tidal Difference [m]	5.58	4.38	5.24	5.06	5.85	5.31	4.71
Net	Vol_{Tot} [1000xm³]	1 062	3 605	690	4 784	6 230	7 108	10 267
	Vol_{Mid} [1000xm³]	-983	548	-1 453	3 214	1 158	2 896	4 841
	T_{ADCP} [HH:MM]	12:14	12:30	12:28	12:38	12:50	12:20	12:20
	Vol_{Est} [1000xm³]	90	225	15	438	295	-183	-214
	T_{Lief} [HH:MM]	12:10	12:30	12:10	12:20	12:50	12:20	12:20

Measurement Day		***17/11/05***	***22/03/06***	***27/09/06***	***24/10/07***	***11/03/08***	***19/06/08***	***26/06/08***
Fresh water (Schelle)	Volume [1000xm³]	3 987	4 248	1 473	2 069	12 741	1 199	888
	T_{ADCP} [HH:MM]	12:14	12:30	12:28	12:38	12:50	12:20	12:20
Deurganck dok	Area [km²]	750.154	750.154	750.154	1 018.61	1 018.61	1 018.61	1 018.61

Table 5-4 SS Mass during ebb, flood and measurement campaign on 17/11/2005 (Spring tide), 22/03/2006 (Neap tide), 27/09/2006 (Average tide), 24/10/2007 (Average tide), 11/03/2008 (Spring tide), 19/06/08 (Average tide) & 26/06/08 (Average tide), including SS Masses with Sediview's estimates (SSM_{Tot}) and without estimates (SSM_{Mid}). The duration is based on ADCP measurements (T_{ADCP})

Measurement Day		***17/11/05***	***22/03/06***	***27/09/06***	***24/10/07***	***11/03/08***	***19/06/08***	***26/06/08***
Ebb	SSM_{Tot} [Tonnes]	-210	-267	-126	34	655	57	75
	SSM_{Mid} [Tonnes]	-345	-342	-139	-25	133	-34	-82
	T_{ADCP} [HH:MM]	6:50	6:20	6:40	7:24	7:44	6:49	6:20
	Tidal Difference [m]	5.7	4.68	5.26	5.49	6.14	5.13	4.74
Flood	SSM_{Tot} [Tonnes]	-277	-338	-256	-175	-1 163	-295	-182
	SSM_{Mid} [Tonnes]	-129	-235	-177	-126	-790	-249	-119
	T_{ADCP} [HH:MM]	5:24	6:10	5:48	5:11	5:05	5:30	6:00
	Tidal Difference [m]	5.58	4.38	5.26	5.06	5.85	5.31	4.71
Net	SSM_{Tot} [Tonnes]	-487	-605	-382	-141	-508	-238	-107
	SSM_{Mid} [Tonnes]	-474	-577	-316	-151	-657	-282	-201
	T_{ADCP} [HH:MM]	12:14	12:30	12:28	12:35	12:22	12:20	12:20

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IMDC (2006q) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 5.3 Overview of ambient conditions in the river Scheldt – Januari-June 2006 (I/RA/11291/06.089/MSA), in opdracht van AWZ.

IMDC (2006r) Mer verruiming Westerschelde, Nota Bovenafvoer Scheldebekken, I/NO/11282/06.104/FPE.

IMDC (2007a) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 6.2 Summer calibration and Final report, I/RA/11291/06.093/MSA.

IMDC (2007b). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 5.4 Overview of ambient conditions in the river Scheldt – July-December 2006 (I/RA/11291/06.089/MSA), in opdracht van AWZ.

IMDC (2007c). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 11.1 Through tide Measurement Sediview & Siltprofiler 27/9 Stream - Liefkenshoek (I/RA/11291/06.104/MSA), in opdracht van AWZ.

IMDC (2007d). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 11.2 Through tide Measurement Sediview 27/9 Veremans - Raai K (I/RA/11291/06.105/MSA), in opdracht van AWZ.

IMDC (2007e). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 11.3 Through tide Measurement Sediview & Siltprofiler 28/9 Stream - Raai K (I/RA/11291/06.106/MSA), in opdracht van AWZ.

IMDC (2007f). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 11.4 Through tide Measurement Sediview 28/9 Veremans - Waarde(I/RA/11291/06.107/MSA), in opdracht van AWZ.

IMDC (2007g). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 11.5 Through tide Measurement Sediview 28/9 Parel 2 - Schelle (I/RA/11291/06.108/MSA), in opdracht van AWZ.

IMDC (2007h). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 11.6 Through tide Measurement Salinity Distribution 26/9 Scheldewacht – Deurganckdok in opdracht van AWZ.

IMDC (2007i) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.1 Sediment Balance: Three monthly report 1/4/2006 – 30/06/2006 (I/RA/11283/06.113/MSA)

IMDC (2007j) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.2 Sediment Balance: Three monthly report 1/7/2006 – 30/09/2006 (I/RA/11283/06.114/MSA)

IMDC (2007k) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.3 Sediment Balance: Three monthly report 1/10/2006 – 31/12/2006 (I/RA/11283/06.115/MSA)

IMDC (2007l) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.4 Sediment Balance: Three monthly report 1/1/2007 – 31/03/2007 (I/RA/11283/06.116/MSA)

IMDC (2007m) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.5 Annual Sediment Balance (I/RA/11283/06.117/MSA)

IMDC (2007n) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.2 Through tide measurement SiltProfiler 26/09/2006 Stream (I/RA/11283/06.068/MSA)

IMDC (2007o) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.4 Through tide measurement Sediview spring tide 27/09/2006 Parel 2 (I/RA/11283/06.119/MSA)

IMDC (2007p) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.7 Salt-Silt distribution & Frame Measurements Deurganckdok 15/07/2006 – 31/10/2006 (I/RA/11283/06.122/MSA)

IMDC (2007q) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.8 Salt-Silt distribution & Frame Measurements Deurganckdok 15/01/2007 – 15/03/2007 (I/RA/11283/06.123/MSA)

IMDC (2007r) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 3.1 Boundary conditions: Three monthly report 1/1/2007 – 31/03/2007 (I/RA/11283/06.127/MSA)

IMDC (2007s) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing Deelrapport 1.10: Sediment Balance: Three monthly report 1/4/2007 – 30/06/2007 (I/RA/11283/07.081/MSA)

IMDC (2007t) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.11: Sediment Balance: Three monthly report 1/7/2007 – 30/09/2007 (I/RA/11283/07.082/MSA)

IMDC (2007v) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.16: Salt-Silt distribution Deurganckdok summer (21/6/2007 – 30/07/2007) (I/RA/11283/07.092/MSA)

IMDC (2007w) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 3.10: Boundary conditions: Three monthly report 1/04/2007 – 30/06/2007 (I/RA/11283/07.097/MSA)

IMDC (2007u) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 3.11: Boundary conditions: Two monthly report 1/07/2007 – 30/09/2007 (I/RA/11283/07.098/MSA)

IMDC (2008a) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.5: Through tide measurement Sediview average tide 24/10/2007 (I/RA/11283/06.120/MSA)

IMDC (2008b) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 4.1: Analysis of siltation Processes and Factors (I/RA/11283/06.129/MSA)

IMDC (2008c) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.12: Sediment Balance: Four monthly report 1/9/2007 – 31/12/2007 (I/RA/11283/07.083/MSA)

IMDC (2008d) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.13: Sediment Balance: Four monthly report 1/01/2007 – 31/03/2007 (I/RA/11283/07.084/MSA)

IMDC (2008e) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.14: Annual Sediment Balance. (I/RA/11283/07.085/MSA)

IMDC (2008f) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.09: Calibration stationary equipment autumn (I/RA/11283/07.095/MSA)

IMDC (2008g) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.10: Through tide measurement SiltProfiler 23 October 2007 (I/RA/11283/07.086/MSA)

IMDC (2008h) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.11: Through tide measurement Salinity Profiling winter 12 March 2008 (I/RA/11283/07.087/MSA)

IMDC (2008i) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.12: Through tide measurement Sediview winter 11 March 2008 – Transect I (I/RA/11283/07.088/MSA)

IMDC (2008j) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.13: Through tide measurement Sediview winter 11 March 2008 – Transect K (I/RA/11283/07.089/MSA)

IMDC (2008k) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.14: Through tide measurement Sediview winter 11 March 2008 – Transect DGD (I/RA/11283/07.090/MSA)

IMDC (2008l) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.15: Through tide measurement SiltProfiler winter 12 March 2008 (I/RA/11283/07.091/MSA)

IMDC (2008m) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.17: Salt-Silt distribution & Frame Measurements Deurganckdok autumn (17/9/2007-10/12/2007) (I/RA/11283/07.093/MSA)

IMDC (2008n) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.18: Salt-Silt distribution & Frame Measurements Deurganckdok winter (18/02/2007-31/03/2008) (I/RA/11283/07.094/MSA)

IMDC (2008o) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.19: Calibration stationary & mobile equipment winter (I/RA/11283/07.096/MSA)

IMDC (2008p) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 3.12: Boundary conditions: Three monthly report 1/9/2007 – 31/12/2007 (I/RA/11283/07.099/MSA)

IMDC (2008q) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 3.13: Boundary conditions: Three monthly report 1/1/2008 – 31/3/2007 (I/RA/11283/07.100/MSA)

IMDC (2008r) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 3.14: Boundary conditions: Annual report (I/RA/11283/07.101/MSA)

IMDC (2008s) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 4.10: Analysis of siltation Processes and Factors (I/RA/11283/07.102/MSA)

IMDC (2008t) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing Deelrapport 1.20: Sediment Balance: Three monthly report 1/4/2008 – 30/06/2008 (I/RA/11283/08.076/MSA)

IMDC (2008u) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.20: Through tide measurement Sediview during average tide Spring 2008 – 19 June 2008 (I/RA/11283/08.081/MSA)

IMDC (2008v) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.21: Through tide measurement Sediview during average tide Spring 2008 – 26 June 2008 (I/RA/11283/08.082/MSA)

IMDC (2008w) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing Deelrapport 1.21: Sediment Balance: Three monthly report 1/7/2008 – 30/09/2008 (I/RA/11283/08.077/MSA)

IMDC (2008x) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.22: Through tide measurement Sediview during neap tide Summer 2008 – 24 September 2008 (I/RA/11283/08.083/MSA)

IMDC (2008y) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.28: Through tide measurement ADCP eddy Summer 2008 – 1 October 2008 (I/RA/11283/08.089/MSA)

IMDC (2008z) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.32: Salt-Silt distribution Deurganckdok: six monthly report 1/4/2008 – 30/9/2008 (I/RA/11283/08.093/MSA)

IMDC (2008aa) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 3.20: Boundary conditions: Six monthly report 1/4/2008 – 30/09/2008 (I/RA/11283/08.096/MSA)

IMDC (2009a) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.23: Through tide measurement Sediview during spring tide Summer 2008 – 30 September 2008 (I/RA/11283/08.084/MSA)

IMDC (2009b) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.29: Through tide measurement SiltProfiler summer 2008 – 29 September 2008 (I/RA/11283/07.090/MSA)

IMDC (2009c) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.34: Calibration stationary & mobile equipment autumn 2008 (I/RA/11283/08.095/MSA)

IMDC (2009d) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing Deelrapport 1.22: Sediment Balance: Three monthly report 1/10/2008 – 31/12/2008 (I/RA/11283/08.078/MSA)

IMDC (2009e) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.24: Through tide measurement Sediview during neap tide Autumn 2008 (I/RA/11283/08.085/MSA)

IMDC (2009f) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.25: Through tide measurement Sediview during spring tide Autumn 2008 (I/RA/11283/08.086/MSA)

IMDC (2009g) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing Deelrapport 1.23: Sediment Balance: Three monthly report 1/01/2009 – 31/03/2009 (I/RA/11283/08.079/MSA)

IMDC (2009h) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing Deelrapport 1.24: Annual Sediment Balance (I/RA/11283/08.080/MSA)

IMDC (2009i) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.26: Through tide measurement Sediview during neap tide Winter 2009 (I/RA/11283/08.087/MSA)

IMDC (2009j) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.30: Through tide measurement SiltProfiler winter 2009 (I/RA/11283/08.091/MSA)

IMDC (2009k) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.31: Through tide measurement Salinity Profiling winter 2009 (I/RA/11283/08.092/MSA)

IMDC (2009l) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.33: Salt-Silt distribution Deurganckdok: six monthly report 1/10/2008 – 31/3/2009 (I/RA/11283/08.094/MSA)

IMDC (2009m) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 3.21: Boundary conditions: Six monthly report 1/10/2008 – 31/03/2009 (I/RA/11283/08.097/MSA)

IMDC (2009n) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.27: Through tide measurement Sediview during spring tide Winter 2009 (I/RA/11283/08.088/MSA)

IMDC (2009o) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 4.20: Analysis of siltation Processes and Factors (I/RA/11283/08.098/MSA)

TV SAM (2006a) Langdurige stationaire ADCP stroommetingen te Oosterweel dukdalf 01/2005-06/2005. 42SR S032PIB 2A.

TV SAM (2006b) Langdurige stationaire ADCP stroommetingen te Oosterweel dukdalf 07/2005-12/2005. 42SR S033PIB 2A.

TV SAM (2006c) Langdurige stationaire ADCP stroommetingen te Oosterweel dukdalf 01/2006-06/2006. 42SR S032PIB 2A.

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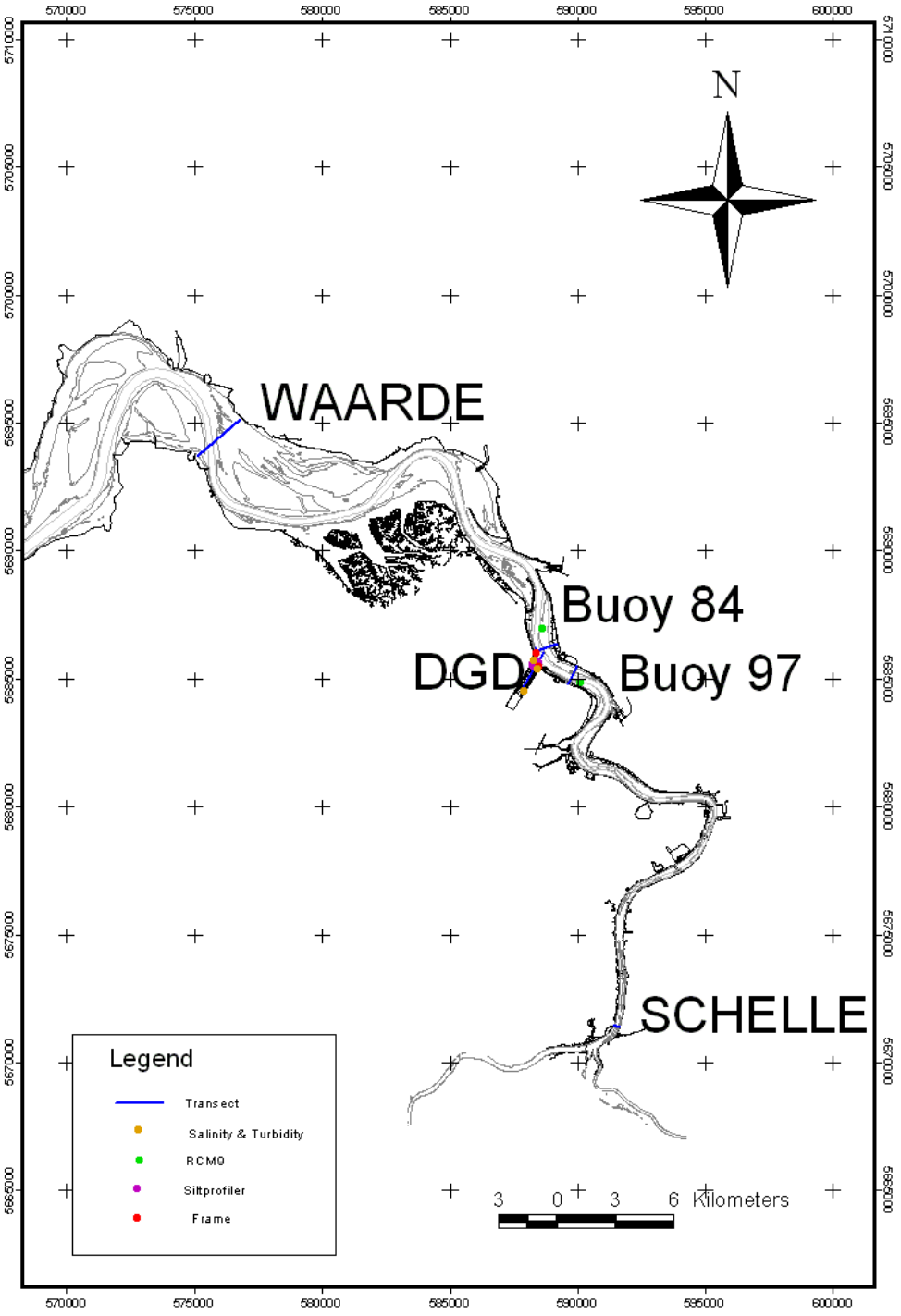
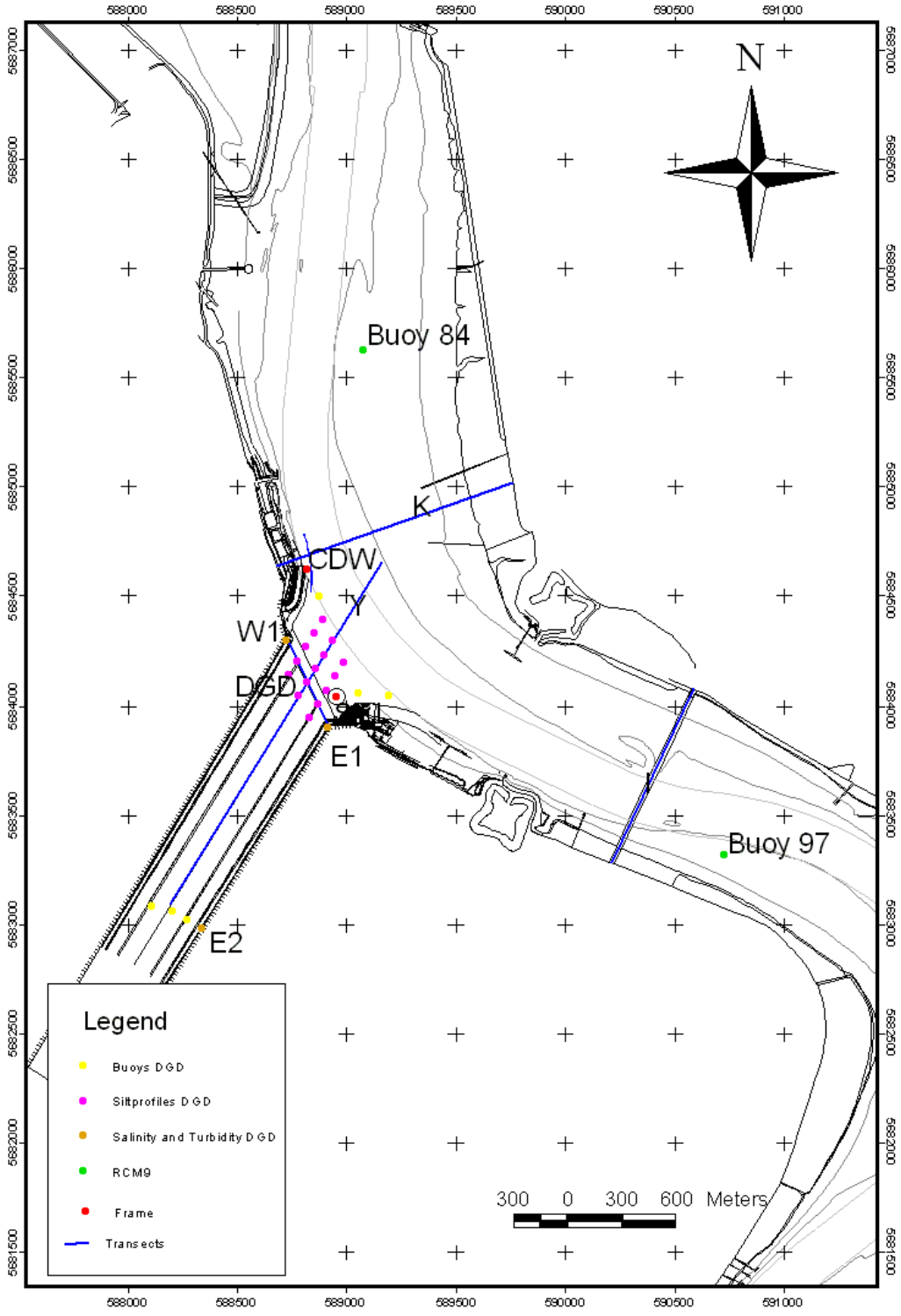
APPENDIX A.

OVERVIEW OF MEASUREMENT

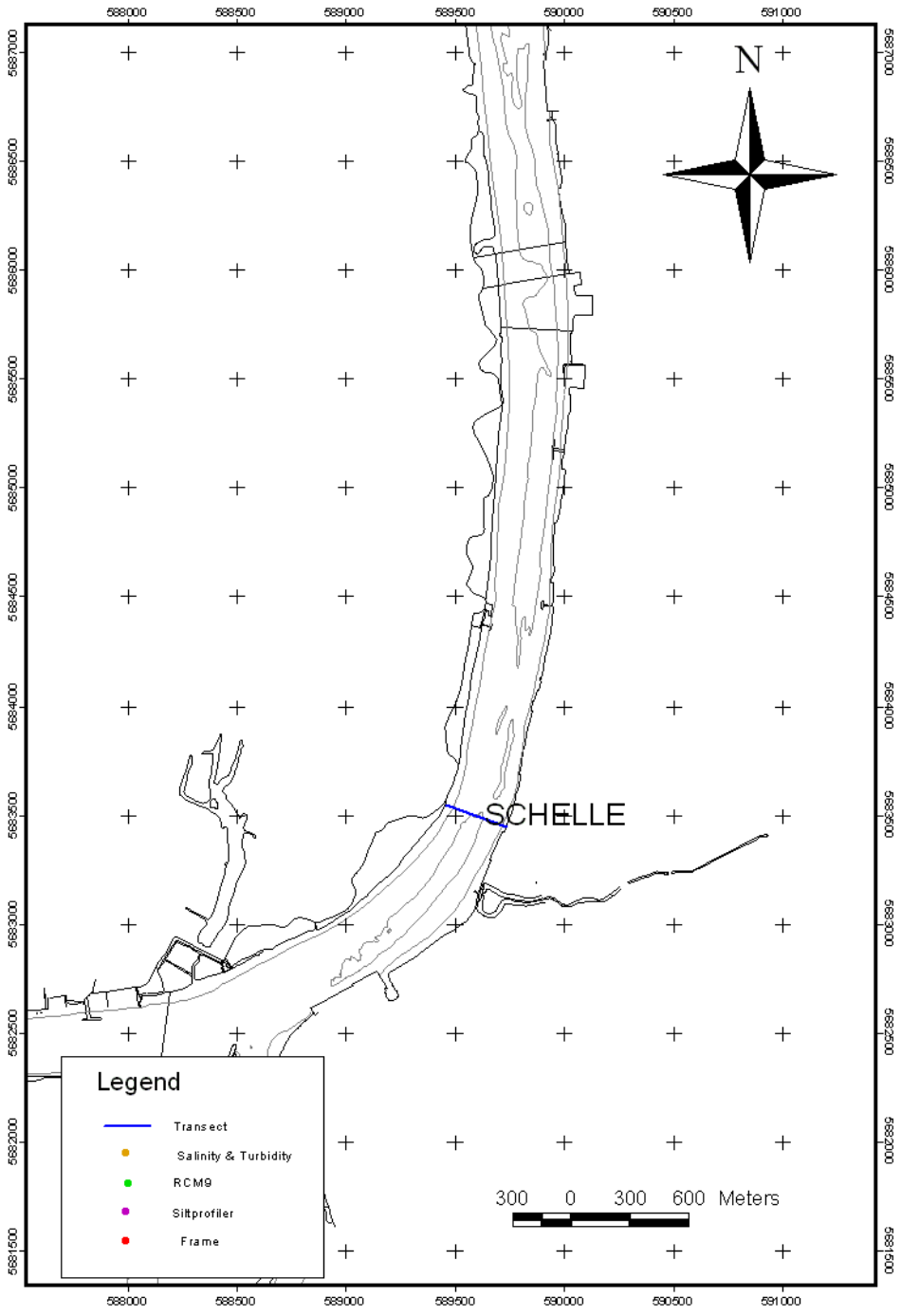
A.1 Overview of the measurement locations for the whole HCBS2 and Deurganckdok measurement campaigns



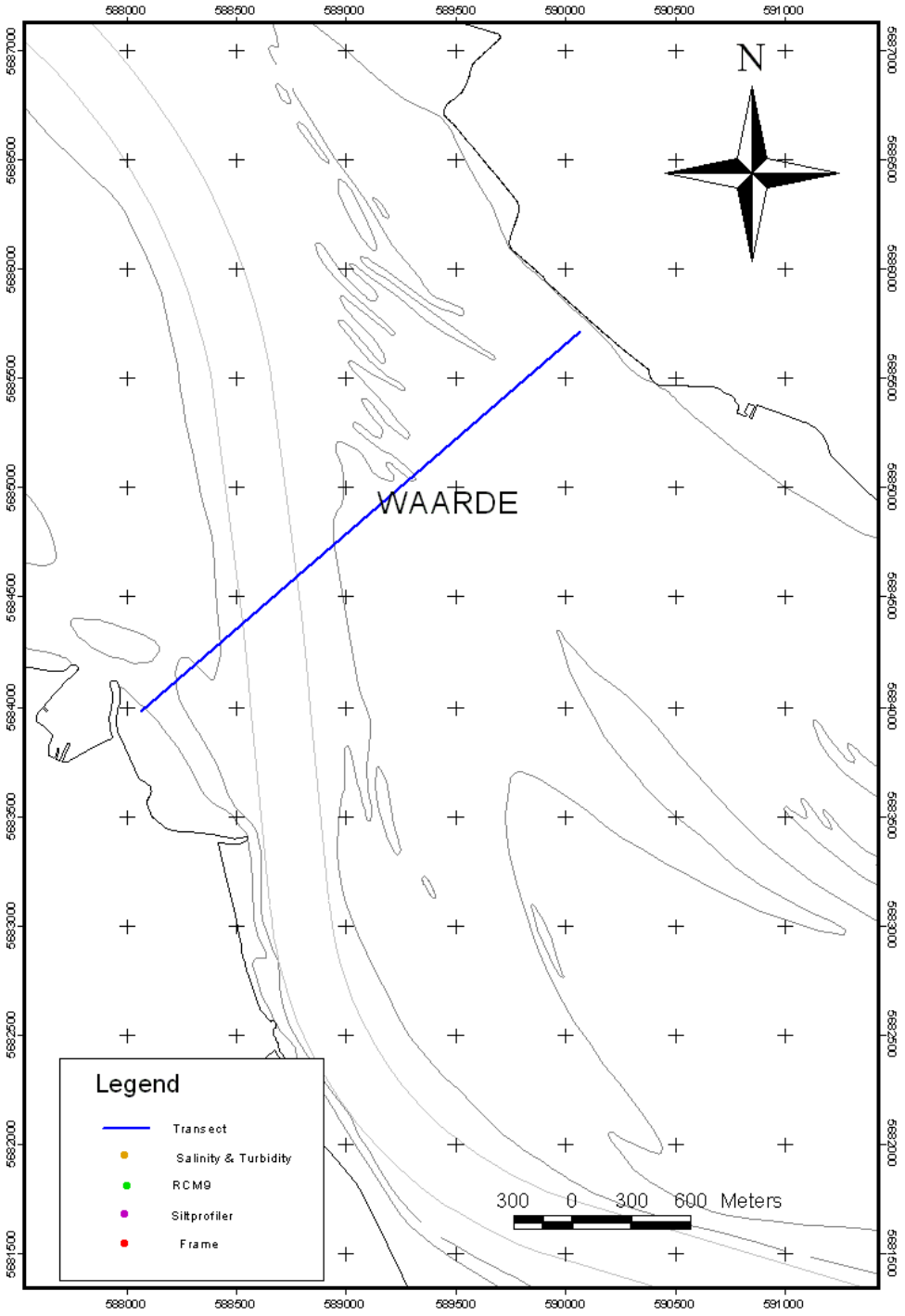
Annex Figure A-1: Overview of the measurement locations



Annex Figure A-2: Overview of the measurement locations at Deurganckdok



Annex Figure A-3: Transect S in Schelle



Annex Figure A-4: Transect W in Waarde

A.2 Overview of all measurement locations HCBS and Deurganckdok measurement campaigns

Annex Table A-1: coordinates of theoretical transects

Transect	*Start Easting*	*Start Northing*	*End Easting*	*End Northing*
I	590318.00	5683302.00	590771.00	5684257.00
K	588484.00	5684924.00	589775.00	5685384.00
SCHELLE	592645.07	5665794.06	592952.68	5665682.28
DGD	588764.88	5684056.49	588540.95	5684526.94
Y	589059.09	5684948.36	587898.76	5683076.56
WAARDE	573541.00	5696848.20	571318.00	5694932.90

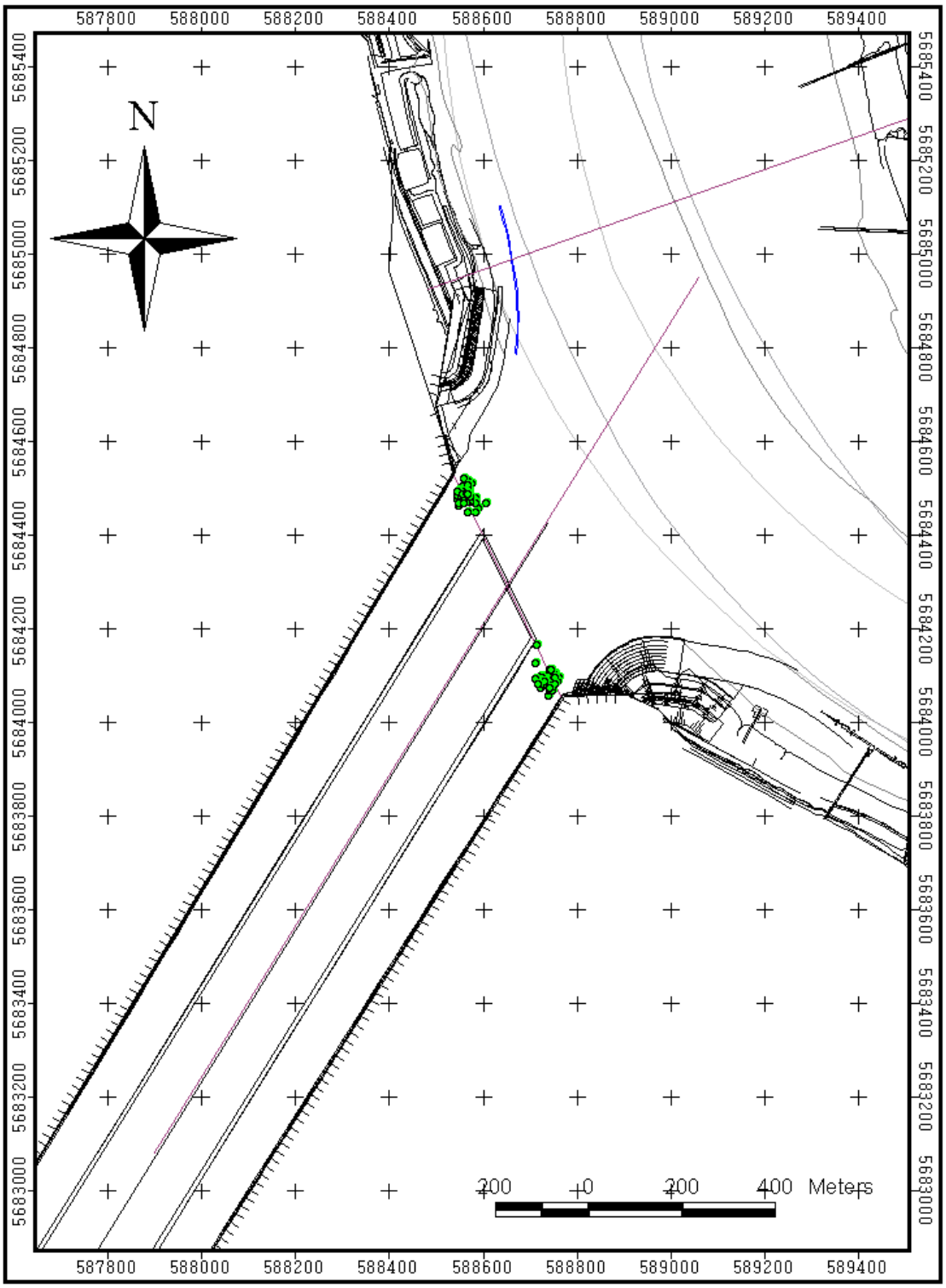
Annex Table A-2: coordinates of SiltProfiler gauging locations

SP	*EASTING*	*NORTHING*
1	588737	5684638
2	588690	5684562
3	588643	5684486
4	588596	5684411
5	588549	5684335
6	588606	5684217
7	588653	5684293
8	588700	5684368
9	588747	5684444
10	588793	5684520
11	588850	5684402
12	588803	5684326
13	588756	5684250
14	588709	5684174
15	588662	5684099

A.3 Measurement overview at Transect DGD on 26/06/2008

FileName	*End time [hh:mm MET]*	*Time after HW [hh:mm]*	*Easting Start (UTM31 ED50)*	*Northing Start (UTM31 ED50)*	*Easting Stop (UTM31 ED50)*	*Northing Stop (UTM31 ED50)*	*Transect length [m]*	*Transect heading [°]*
6003DGDtlr_sub.csv	5:18	-2:44	588551	5684474	588737	5684100	418	154
6005DGDtrl_sub.csv	5:33	-2:31	588754	5684107	588564	5684482	420	-27
6007DGDtlr_sub.csv	5:47	-2:16	588609	5684468	588726	5684102	384	162
6009DGDtrl_sub.csv	6:00	-2:03	588755	5684103	588557	5684489	434	-27
6011DGDtlr.csv	6:15	-1:50	588560	5684485	588726	5684075	442	158
6013DGDtrl.csv	6:27	-1:31	588756	5684103	588563	5684485	428	-27
6015DGDtlr_sub.csv	6:45	-1:17	588586	5684479	588749	5684086	426	157
6017DGDtrl_sub.csv	6:59	-1:05	588740	5684091	588558	5684497	445	-24
6019DGDtlr_sub.csv	7:12	-0:51	588578	5684511	588751	5684086	458	158
6021DGDtrl.csv	7:39	-0:39	588737	5684092	588566	5684487	430	-23
6023DGDtlr_sub.csv	7:45	-0:26	588592	5684457	588734	5684100	383	158
6025DGDtrl.csv	8:00	-0:06	588740	5684088	588547	5684478	435	-26
6027DGDtlr_sub.csv	8:12	0:06	588570	5684448	588747	5684099	392	153
6029DGDtrl_sub.csv	8:24	0:29	588746	5684102	588547	5684484	430	-27
6031DGDtlr_sub.csv	8:48	0:40	588572	5684488	588751	5684091	435	156
6033DGDtrl.csv	8:58	0:51	588748	5684095	588555	5684493	442	-26
6035DGDtlr_sub.csv	9:09	1:01	588587	5684467	588750	5684100	401	156
6037DGDtrl.csv	9:15	1:12	588714	5684128	588563	5684476	380	-23
6039DGDtlr.csv	9:32	1:23	588566	5684490	588744	5684095	433	156
6041DGDtrl.csv	9:41	1:34	588744	5684103	588559	5684474	413	-27
6043DGDtlr_sub.csv	9:54	1:46	588572	5684497	588733	5684083	444	159
6045DGDtrl.csv	10:04	1:59	588741	5684102	588564	5684471	408	-26
6047DGDtlr.csv	10:17	2:12	588585	5684449	588728	5684098	379	158
6049DGDtrl.csv	10:31	2:24	588745	5684115	588557	5684504	432	-26
6051DGDtlr_sub.csv	10:40	2:35	588564	5684483	588753	5684087	439	155
6053DGDtrl.csv	10:53	2:56	588714	5684095	588560	5684474	409	-22
6055DGDtlr_sub.csv	11:14	3:11	588569	5684515	588749	5684092	459	157
6057DGDtrl_sub.csv	11:29	3:26	588747	5684116	588556	5684486	417	-27
6059DGDtlr.csv	11:44	3:39	588569	5684497	588747	5684083	451	157
6061DGDtlr_sub.csv	11:58	4:45	588753	5684086	588575	5684472	425	-25
6063DGDtrl.csv	13:02	4:55	588550	5684495	588748	5684087	453	154
6065DGDtlr.csv	13:14	5:11	588747	5684088	588560	5684521	472	-23
6067DGDtrl.csv	13:29	5:23	588550	5684464	588739	5684082	426	154
6069DGDtlr_sub.csv	13:42	5:35	588758	5684097	588569	5684508	452	-25
6071DGDtrl_sub.csv	14:00	5:49	588559	5684494	588747	5684074	460	156
6073DGDtlr_sub.csv	14:07	6:10	588763	5684098	588550	5684469	428	-30
6075DGDtrl_sub.csv	14:28	-5:53	588570	5684472	588744	5684089	420	156
6077DGDtlr.csv	14:45	-5:37	588760	5684089	588567	5684473	430	-27
6079DGDtrl.csv	15:01	-5:26	588556	5684483	588742	5684059	462	156
6081DGDtlr_sub.csv	15:12	-5:13	588743	5684072	588569	5684450	416	-25

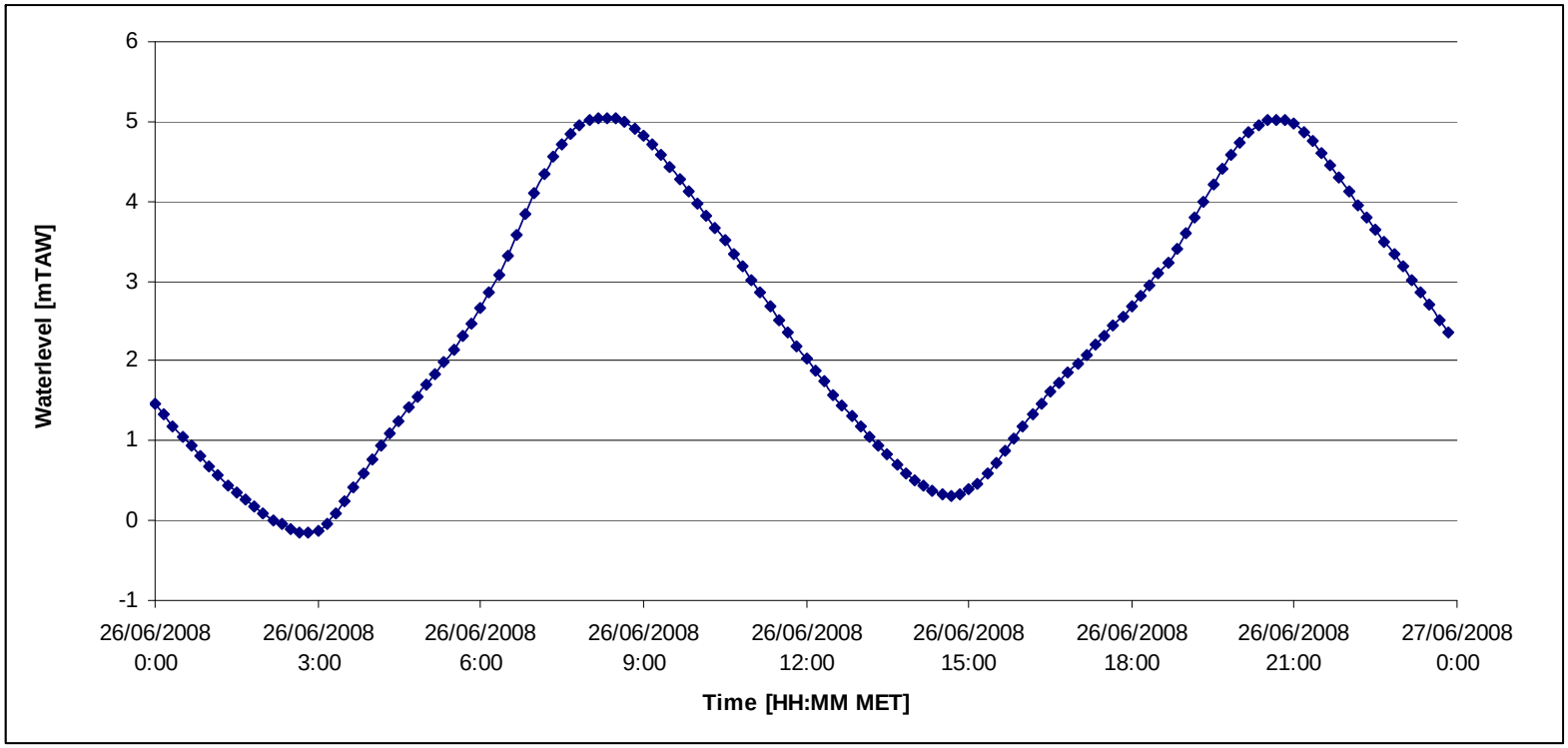
FileName	*End time [hh:mm MET]*	*Time after HW [hh:mm]*	*Easting Start (UTM31 ED50)*	*Northing Start (UTM31 ED50)*	*Easting Stop (UTM31 ED50)*	*Northing Stop (UTM31 ED50)*	*Transect length [m]*	*Transect heading [°]*
6083DGDtrl.csv	15:30	-5:02	588548	5684493	588715	5684168	366	153
6085DGDtlr.csv	15:36	-4:49	588749	5684093	588565	5684480	428	-26
6087DGDtrl_sub.csv	15:49	-4:27	588562	5684468	588754	5684099	416	153
6089DGDtlr.csv	16:10	-3:50	588751	5684072	588569	5684482	449	-24
6091DGDtrl.csv	16:48	-3:37	588560	5684481	588733	5684089	427	156
6093DGDtlr_sub.csv	17:00	-3:23	588751	5684080	588574	5684482	439	-24
6095DGDtrl_sub.csv	17:15	-3:11	588559	5684489	588720	5684086	434	158
6097DGDtlr.csv	17:26	-2:58	588754	5684085	588566	5684491	447	-25
6099DGDtrl_sub.csv	17:40	-2:44	588568	5684489	588743	5684075	450	157



Annex Figure A-5: Location of start en end points of the sailed tracks on 21/06/2008

APPENDIX B. TIDAL DATA

11283 – March 2008 SURVEY



Measured tide on 26/06/2008 at Liefkenshoek

Location:	Date:
River Scheldt	26/06/2008

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/08.082/MSA

APPENDIX C.

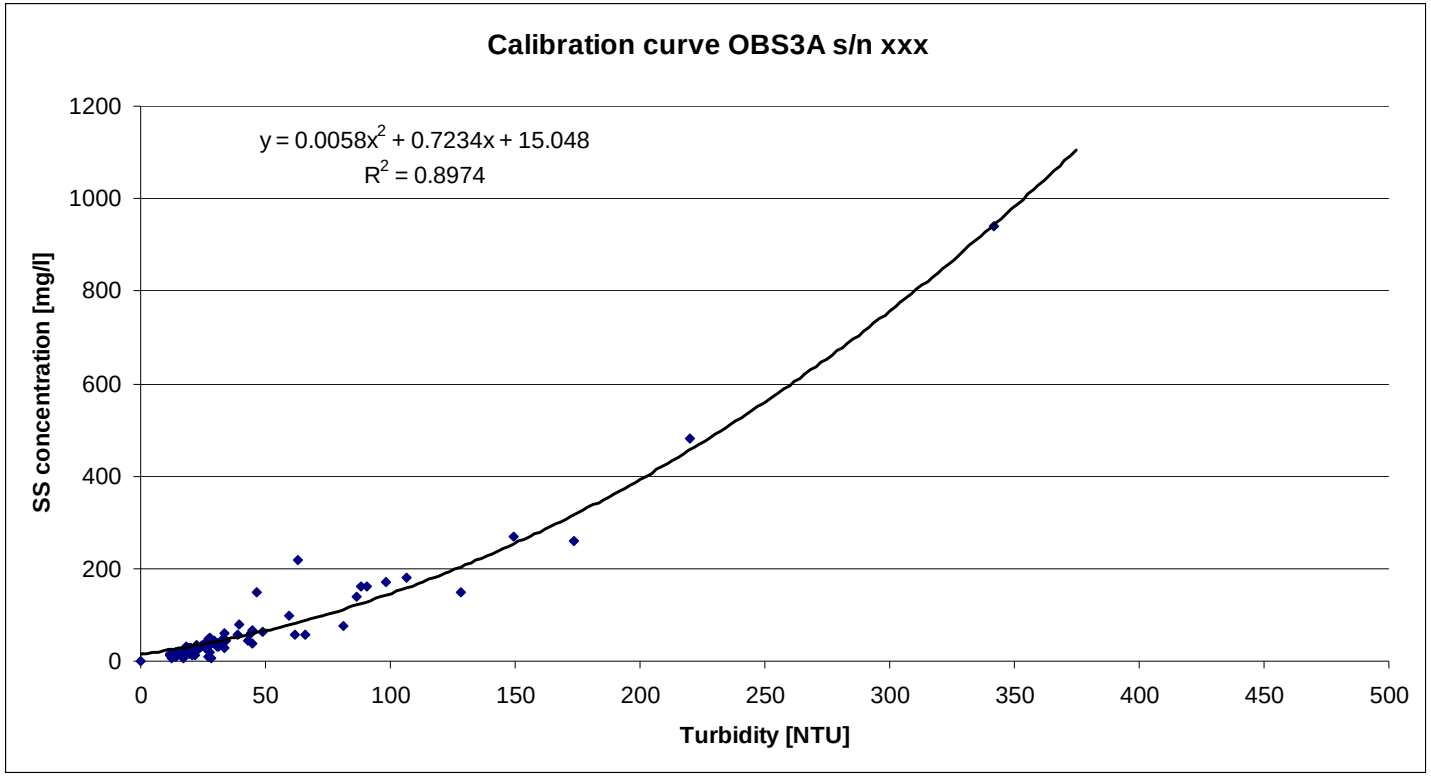
NAVIGATION INFORMATION AS RECORDED ON SITE

Ship:		***Scheldewacht II***	
Location:		***Deurganckdok (transect DGD)***	
Nr.	***Time (MET)***	***Type ship***	***Direction (Invaart, Uitvaart)***
1	5:16	(Ruth) Kuster	***in***
2	5:27	(Kosiak) Sleper	***in***
3	5:30	(Union 8) Sleper	***in***
4	5:47	(Ruth) Kuster	***uit***
5	5:49	(AD Fund.) Duwbak	***uit***
6	6:13	(Venray) Binnenschip	***in***
7	6:14	('D180') Duwbak	***uit***
8	6:23	(Alcedo) Binnenschip	***uit***
9	6:29	(Delqiru) Binnenschip	***uit***
10	6:36	(Union Emerald) Container	***uit***
11		Gosco ningro	
12	6:37	(Union Kodiak) Sleper	***uit***
13	6:47	(Jessielab) Kuster	***in***
14	7:08	(Norma) Binnenschip	**in**
15	7:30	(Willem Sr) Binnenschip	**uit**
16	7:51	(Union Emerald) Sleper	**in**
17	8:48	(Feloek) Binnenschip	**in**
18	8:07	(Aquamyra) Binnenschip	**in**
19	9:47	(Lianco) Duwvaart	**in**
20	10:14	(Skyline) Binnenschip	**in**
21	10:24	(Feloek) Binnenschip	**uit**
22	10:28	(Jericho) Binnenschip	**in**
23	10:45	(Amistade) Binnenschip	**in**
24	10:57	(Marea) Binnenschip	**in**
25	11:30	(Veremans) Peilboot	**in**
26	11:50	(Veremans) Peilboot	**uit**
27	11:57	(Oxford) Binnenschip	**in**
28	13:46	(Marea) Binnenschip	**uit**
29	14:02	(Klasarina) Binnenschip	**uit**
30	14:07	(Vancouver) Tanker	**in**
31	14:20	(IBN Asakir) Container	**in**

Ship:		***Scheldewacht II***	
Location:		***Deurganckdok (transect DGD)***	
Nr.	***Time (MET)***	***Type ship***	***Direction (Invaart, Uitvaart)***
32		Union Grizzly	**in**
33	14:24	(Wesley) Binnenschip	**uit**
34	14:33	(Skyline) Binnenschip	**uit**
35	14:37	(Olievinkier IV) Tanker	**in**
36	14:39	(Iduna) Kuster	**in**
37	14:57	(Lianco) Duwvaart	**uit**
38	15:02	(Union Grizzly) Sleper	**uit**
39	15:06	(Schelde 10) Sleper	**uit**
40	15:10	Loodsbootje	**uit**
41	15:15	(Renjo) Binnenschip	**in**
42	15:27	(Wesley) Binnenschip	**out**
43	15:32	(Antigoon) Duwbak	**out**
44	15:43	(Renjo) Duwvaart	**out**
45	16:13	(Jericho) Binnenschip	**out**
46	16:14	(Querroy) Binnenschip	**in**
47	16:17	(Kevin) Duwvaart	**out**
48	16:26	(Norma) Duwvaart	**out**
49	16:45	(Skyline) Binnenschip	**in**
50	17:25	(Dibo) Duwvaart	**in**

APPENDIX D. CALIBRATION GRAPH OF OBS3A TURBIDITY SENSOR

11283 – March 2008 SURVEY



Calibration Graph of OBS3A s/n xxx

Location:	Date:
River Scheldt (DGD)	26/06/2008

Data processed by: IMDC

In association with: wl | delft hydraulics, GEMS International

I/RA/11283/08.082/MSA

APPENDIX E.

UNESCO PPS-78 FORMULA FOR CALCULATING SALINITY

Practical Salinity Scale (PPS 78) Salinity in the range of 2 to 42

Constants from the 19th Edition of Standard Methods

R cond.ratio	0.0117	$R = \frac{C}{42.914 mS/cm}$
C Cond at t	**0.5**	**Input conductivity in mS/cm of sample**
t deg. C	**22.00**	**Input temperature of sample solution**
P dBar	**20**	**Input pressure at which sample is measured in decibars**
Rp	1.0020845	$R_p = 1 + \frac{p(e_1 + e_2 p + e_3 p^2)}{1 + d_1 t + d_2 t^2 + (d_3 + d_4 t)R}$
rt	1.1641102	$r_t = c_0 + c_1 t + c_2 t^2 + c_3 t^3 + c_4 t^4$
Rt	0.0099879	$R_t = \frac{R}{R_p \times r_t}$
Delta S	-0.0010	$\text{Delta } S = \frac{(t-15)}{1+k(t-15)}(b_0 + b_1 R_t^{1/2} + b_2 R_t + b_3 R_t^{3/2} + b_4 R_t^2 + b_5 R_t^{5/2})$
S = Salinity	**0.257**	$S = a_0 + a_1 R_t^{1/2} + a_2 R_t + a_3 R_t^{3/2} + a_4 R_t^2 + a_5 R_t^{5/2} + \text{delta } S$

a0	0.0080	b0	0.0005	c0	0.6766097	d1	3.426E-02	e1	2.070E-04
a1	-0.1692	b1	-0.0056	c1	2.00564E-02	d2	4.464E-04	e2	-6.370E-08
a2	25.3851	b2	-0.0066	c2	1.104259E-04	d3	4.215E-01	e3	3.989E-12
a3	14.0941	b3	-0.0375	c3	-6.9698E-07	d4	-3.107E-03		
a4	-7.0261	b4	0.0636	c4	1.0031E-09				
a5	2.7081	b5	-0.0144						
		k	0.0162						

R = ratio of measured conductivity to the conductivity of the Standard Seawater Solution

Conductivity Ratio R is a function of salinity, temperature, and hydraulic pressure. So that we can factor R into three parts i.e.

R = Rt x Rp x rt

R = C(S,t,p)/C(35,15,0)

C = 42.914 mS/cm at 15 deg C and 0 dbar pressure ie C(35,15,0) where 35 is the salinity

Ocean pressure is usually measured in decibars. 1 dbar = 10^-1 bar = 10^5 dyne/cm^2 = 10^4 Pascal.

APPENDIX F. OVERVIEW OF SEDIVIEW SETTINGS

Ship:	***Scheldewacht II***
Location:	***Deurganckdok (transect DGD)***
Date	***26/06/2008***

Parameters	***Value***	***Parameters***	***Value***
Inst. Depth (m)	1.8	*Compass offset (°)*	2.3
Force depth (m)	0	*Beam 3 misalignment (°)*	0
Velocity reference	BT	*Effective particle size (µm)*	20
Speed of sound algorithm	Urick	*Beam1 scale factor*	0.428
Error velocity	YES	*Beam2 scale factor*	0.417
External heading	NO	*Beam3 scale factor*	0.430
External Depth	NO	*Beam4 scale factor*	0.445
SSC factor top (%)	100	*Discharge factor top*	Constant
SSC factor bottom (%)	Variable	*Discharge factor bottom*	Power
Shape factor left bank	0.91	*Shape factor right bank*	0.91

Filename	***Calibration const (Ks)***	***Backscatter coefficient (S)***	***SSC factor bottom (%)***	***Distance to the left bank (m)***	***Distance to the right bank (m)***
6003DGDtlr_sub.csv	53	20	125	52.10	51.67
6005DGDtrl_sub.csv	53	20	125	50.36	51.29
6007DGDtlr_sub.csv	53	20	125	82.67	57.99
6009DGDtrl_sub.csv	53	20	125	40.95	46.58
6011DGDtlr.csv	53	20	125	46.67	33.97
6013DGDtrl.csv	53	20	125	47.62	46.17
6015DGDtlr_sub.csv	53	20	125	62.59	33.92
6017DGDtrl_sub.csv	53	20	125	34.09	42.36
6019DGDtlr_sub.csv	53	20	125	30.70	33.67
6021DGDtrl.csv	53	20	125	47.07	44.69
6023DGDtlr_sub.csv	53	20	125	85.48	53.43
6025DGDtrl.csv	53	20	125	46.75	39.55
6027DGDtlr_sub.csv	53	20	125	83.86	46.24
6029DGDtrl_sub.csv	53	20	125	41.75	50.01
6031DGDtlr_sub.csv	53	20	125	48.78	37.92
6033DGDtrl.csv	53	20	125	37.18	42.62
6035DGDtlr_sub.csv	53	20	125	74.26	45.94
6037DGDtrl.csv	53	20	125	55.52	86.74
6039DGDtlr.csv	53	20	125	43.59	44.73
6041DGDtrl.csv	53	20	125	56.15	51.98
6043DGDtlr_sub.csv	53	20	125	40.38	37.96
6045DGDtrl.csv	53	20	125	60.71	52.35

Filename	*Calibration const (Ks)*	*Backscatter coefficient (S)*	*SSC factor bottom (%)*	*Distance to the left bank (m)*	*Distance to the right bank (m)*
6047DGDtlr.csv	53	20	125	89.80	53.66
6049DGDtrl.csv	53	20	125	27.35	61.81
6051DGDtlr_sub.csv	53	20	125	49.24	33.06
6053DGDtrl.csv	53	20	125	56.44	56.94
6055DGDtlr_sub.csv	53	20	125	23.34	39.19
6057DGDtrl_sub.csv	53	20	125	43.66	61.48
6059DGDtlr.csv	53	20	125	39.44	31.52
6061DGDtlr_sub.csv	53	20	125	64.19	32.16
6063DGDtrl.csv	53	20	125	32.36	35.81
6065DGDtlr.csv	53	20	125	13.28	36.73
6067DGDtrl.csv	53	20	125	61.19	34.35
6069DGDtlr_sub.csv	53	20	125	29.37	39.98
6071DGDtrl_sub.csv	53	20	125	37.14	24.25
6073DGDtlr_sub.csv	53	20	125	55.78	38.74
6075DGDtrl_sub.csv	53	20	125	62.58	38.98
6077DGDtlr.csv	53	20	125	59.36	31.91
6079DGDtrl.csv	53	20	125	46.57	12.92
6081DGDtlr_sub.csv	53	20	125	81.90	23.65
6083DGDtrl.csv	53	20	125	33.36	122.00
6085DGDtlr.csv	53	20	125	53.01	40.47
6087DGDtrl_sub.csv	53	20	125	62.10	43.97
6089DGDtlr.csv	53	20	125	52.51	20.49
6091DGDtrl.csv	53	20	125	50.36	43.92
6093DGDtlr_sub.csv	53	20	125	54.75	28.03
6095DGDtrl_sub.csv	53	20	125	42.07	46.45
6097DGDtlr.csv	53	20	125	43.49	30.92
6099DGDtrl_sub.csv	53	20	125	45.88	26.11

APPENDIX G. CONTOURPLOTS OF FLOW VELOCITIES, SEDIMENT CONCENTRATION AND SEDIMENT FLUX PER SAILED TRANSECT

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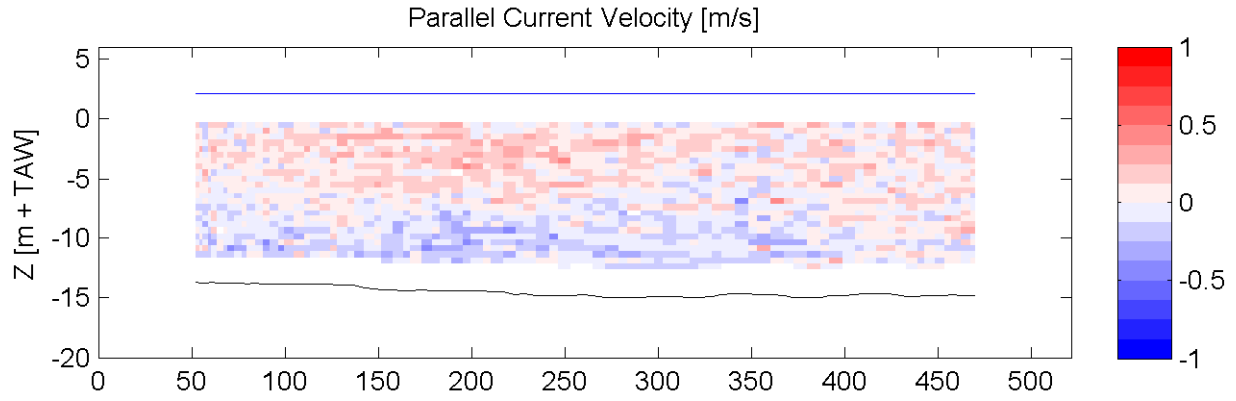
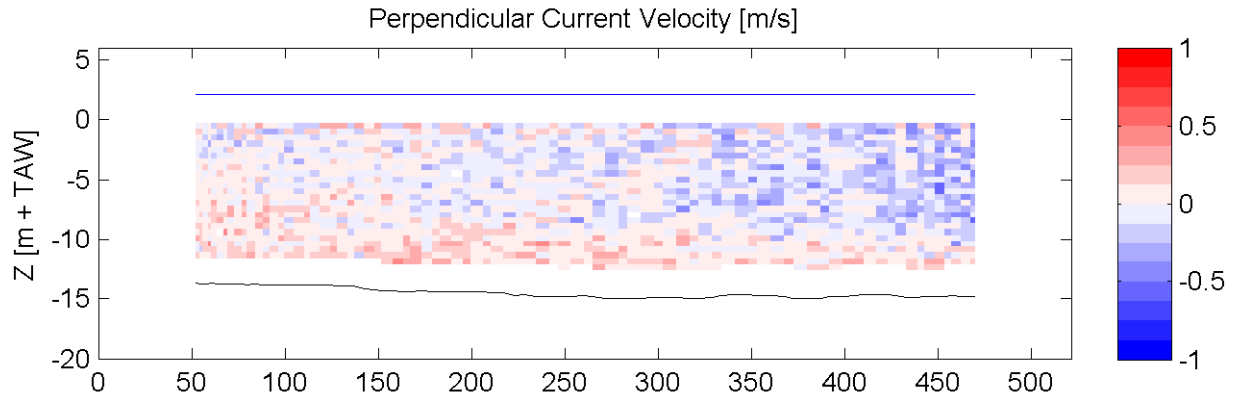
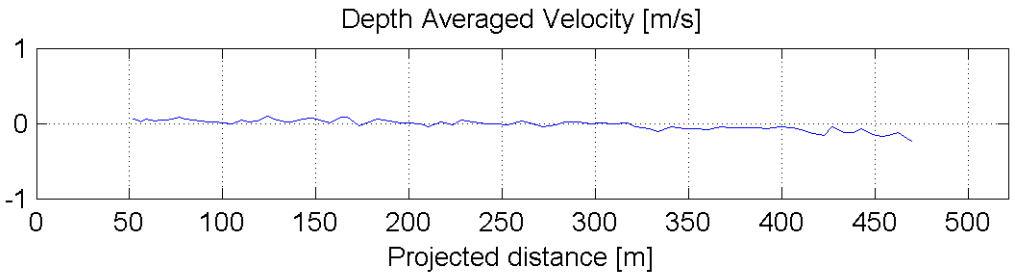
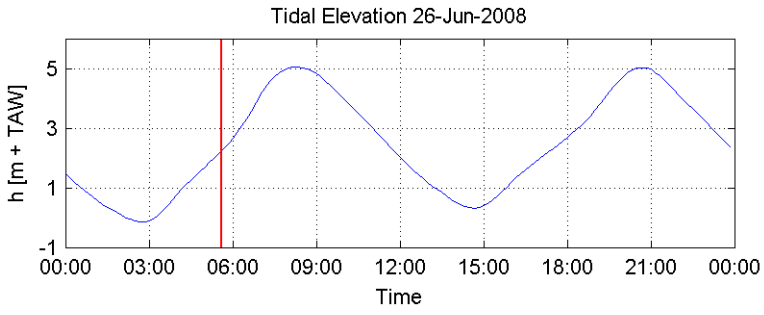
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6003DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

05:33 - 05:36

Time after HW [HH:MM]

-2:44

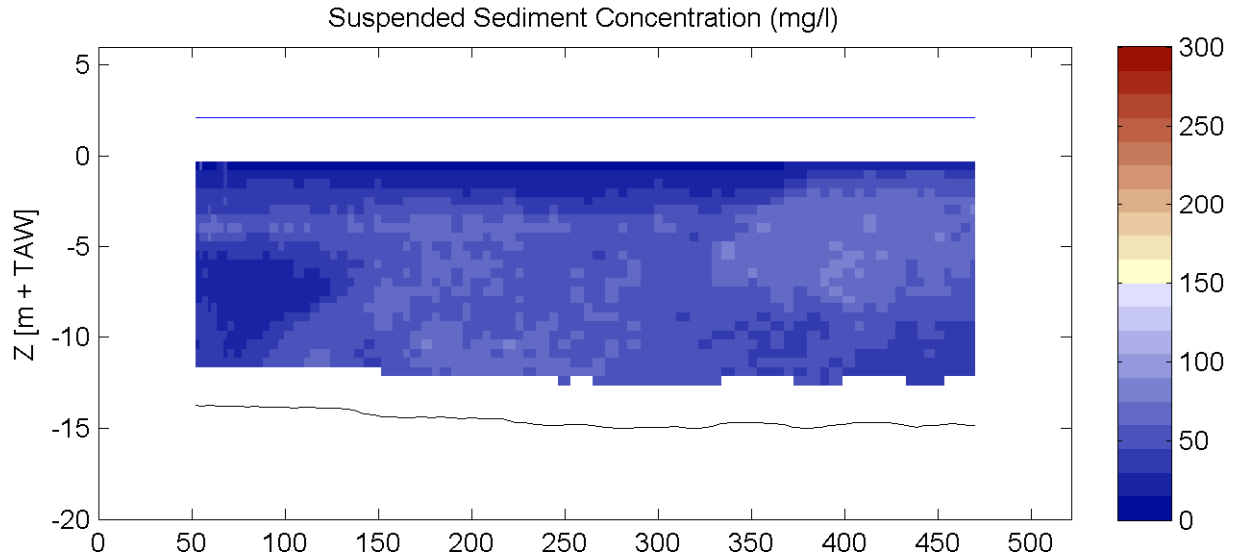
Data Processed by: IMDC

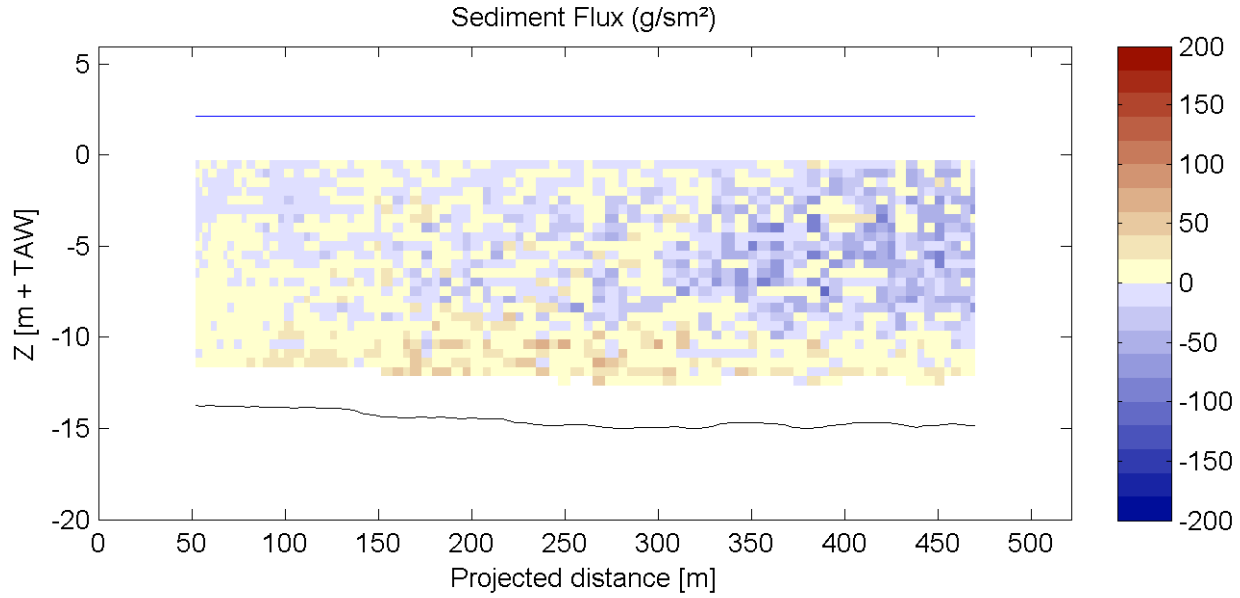
In association with : w.l | delft hydraulics, GEMS

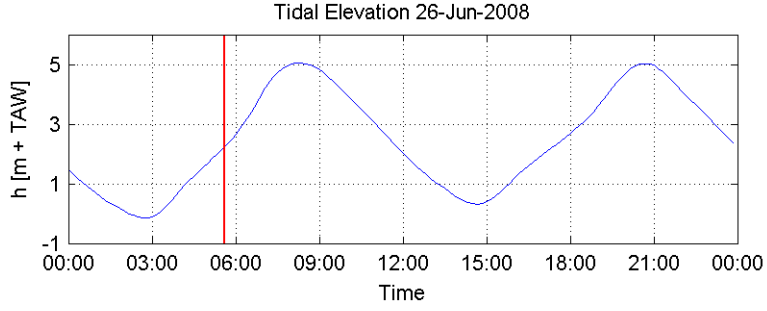
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6003DGDtlr_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

05:33 - 05:36

Time after HW [HH:MM]

-2:44

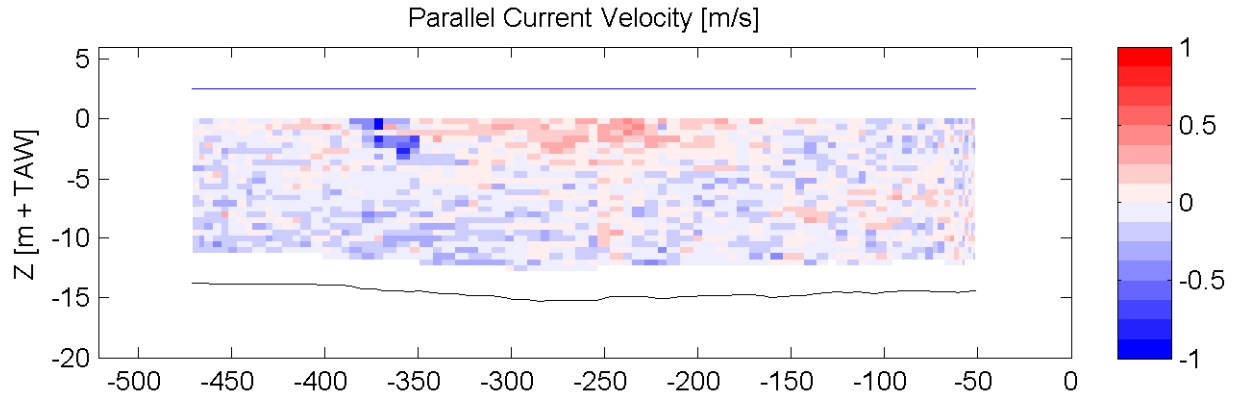
Data Processed by: IMDC

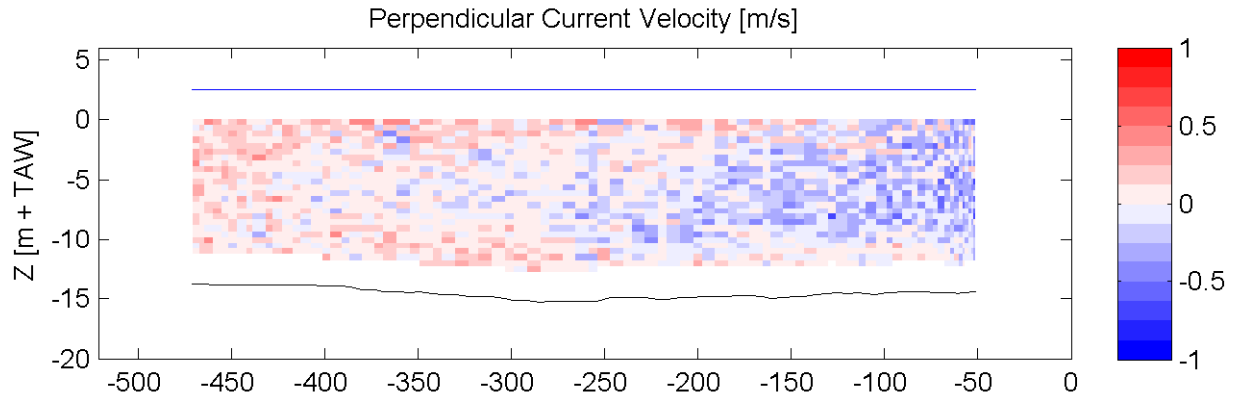
In association with : WL | delft hydraulics, GEMS International

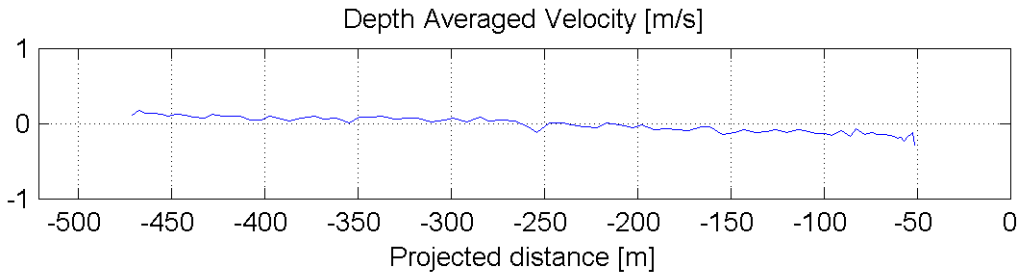
I/RA/11283/08.082/MSA

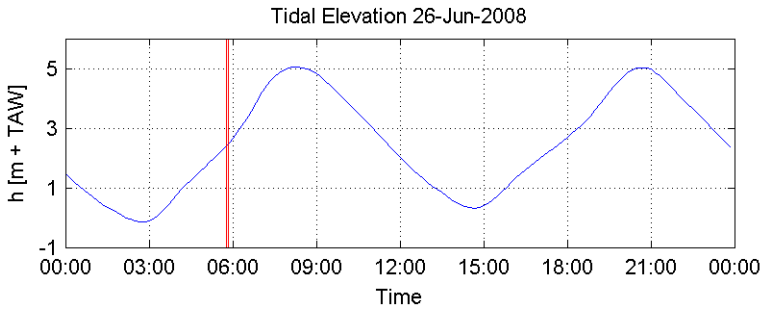
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6005DGDtrl_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

05:47 - 05:50

Time after HW [HH:MM]

-2:31

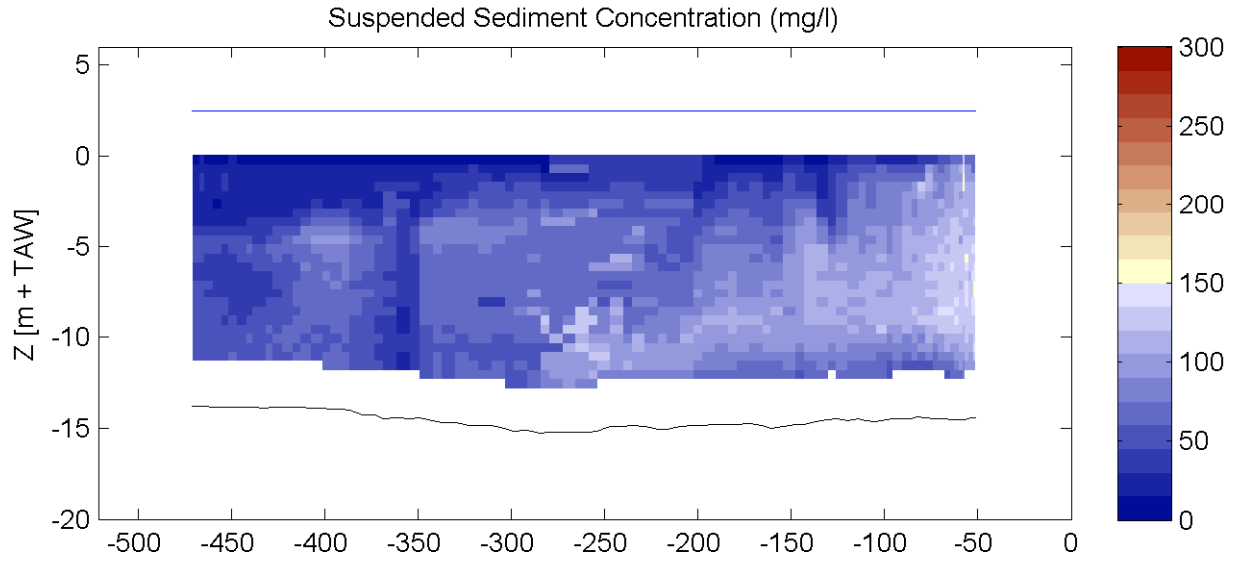
Data Processed by: IMDC

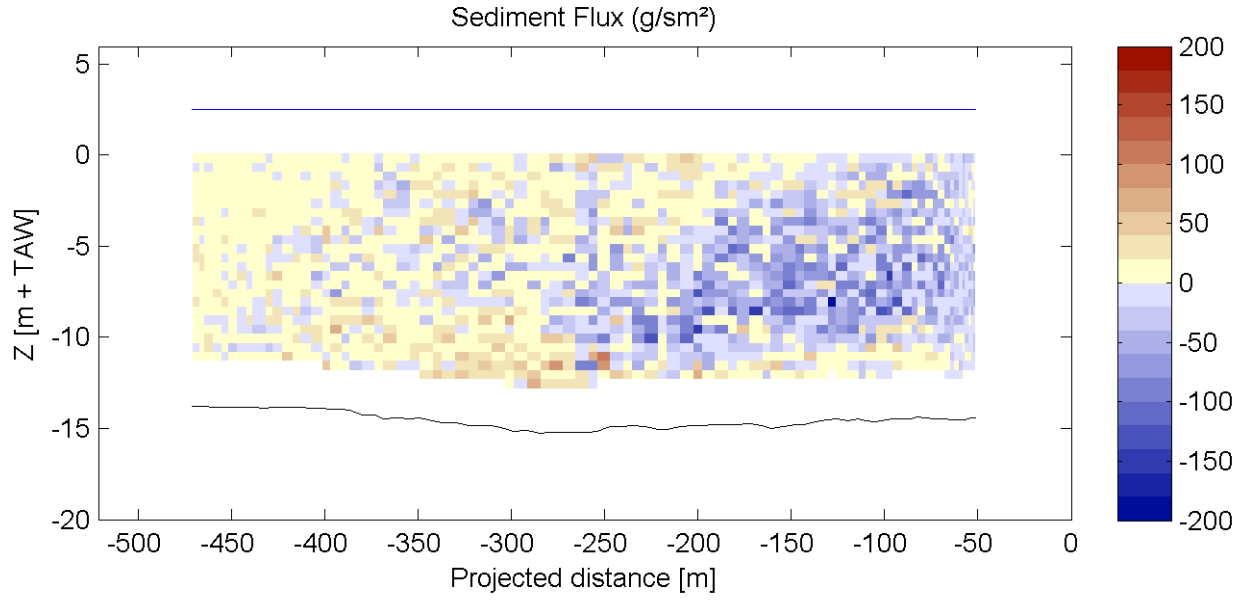
In association with : w.l | delft hydraulics, GEMS International

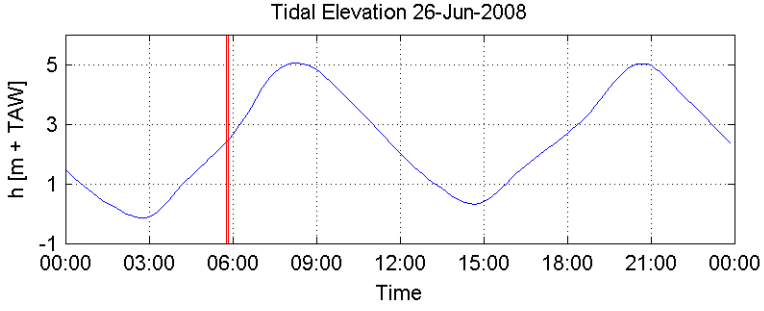
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6005DGDtrl_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

05:47 - 05:50

Time after HW [HH:MM]

-2:31

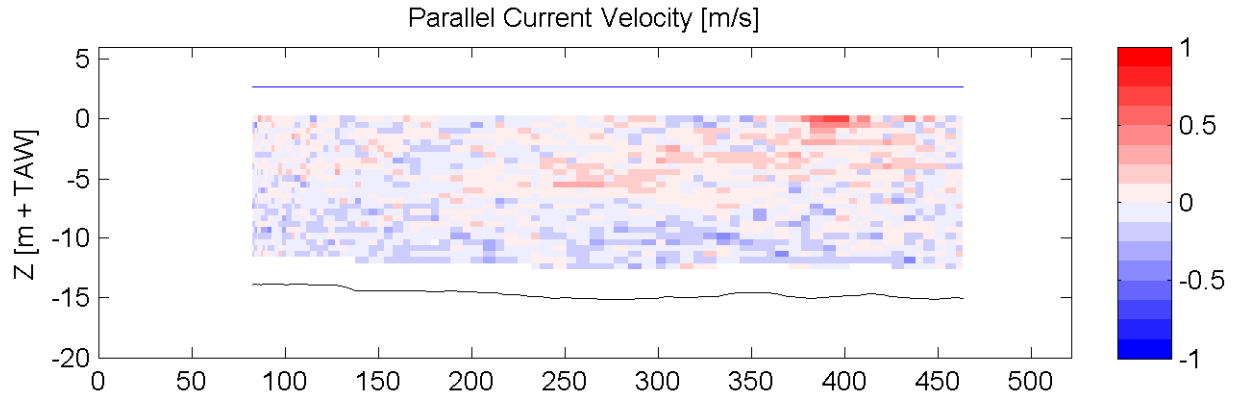
Data Processed by: IMDC

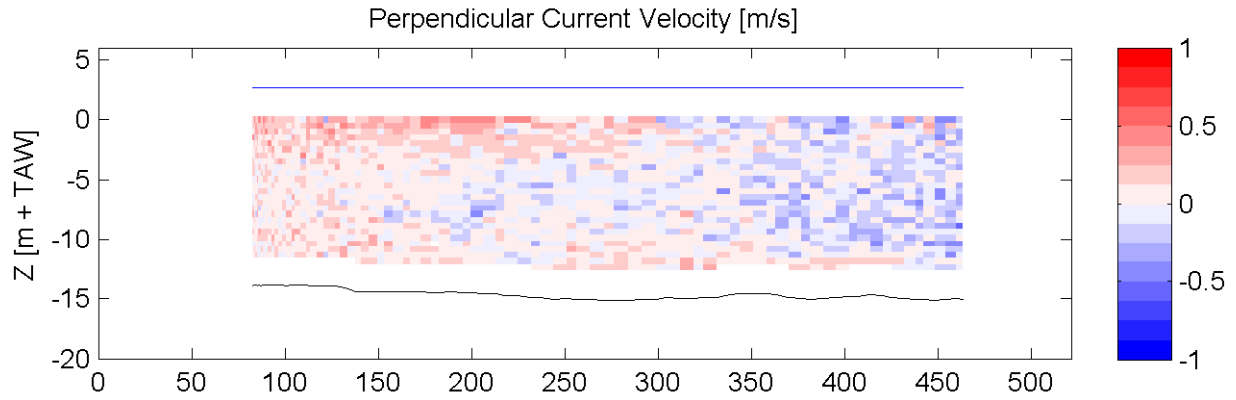
In association with : WL | delft hydraulics, GEMS International

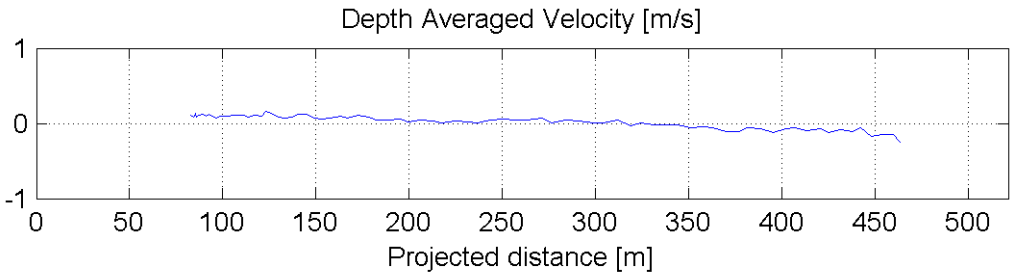
I/RA/11283/08.082/MSA

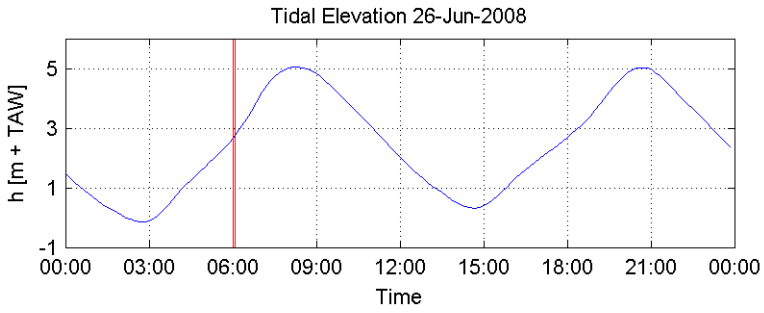
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6007DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

06:01 - 06:05

Time after HW [HH:MM]

-2:16

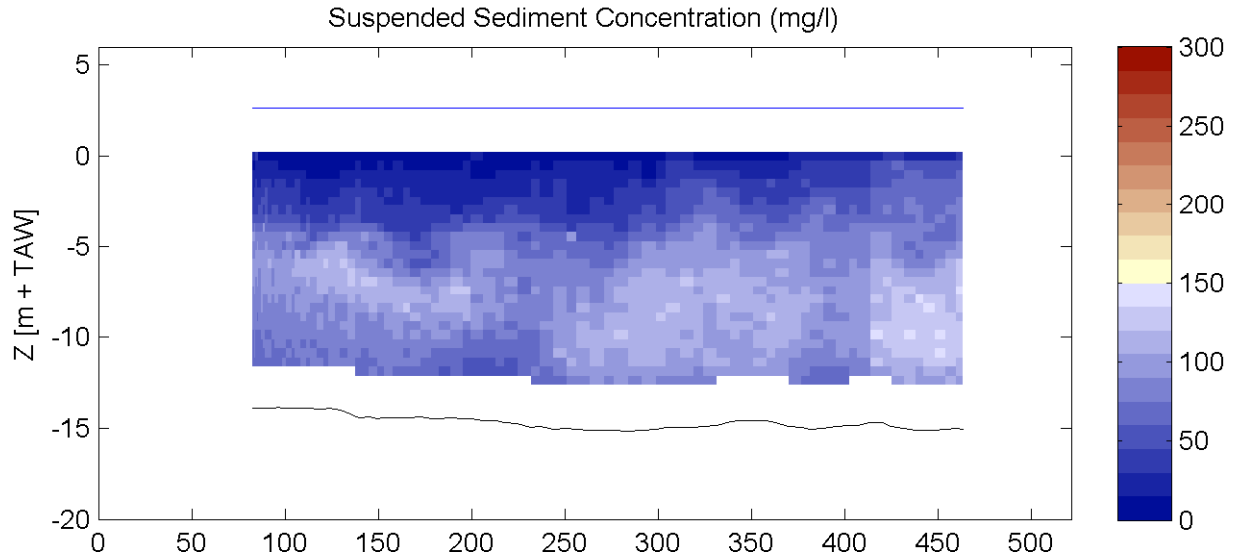
Data Processed by: IMDC

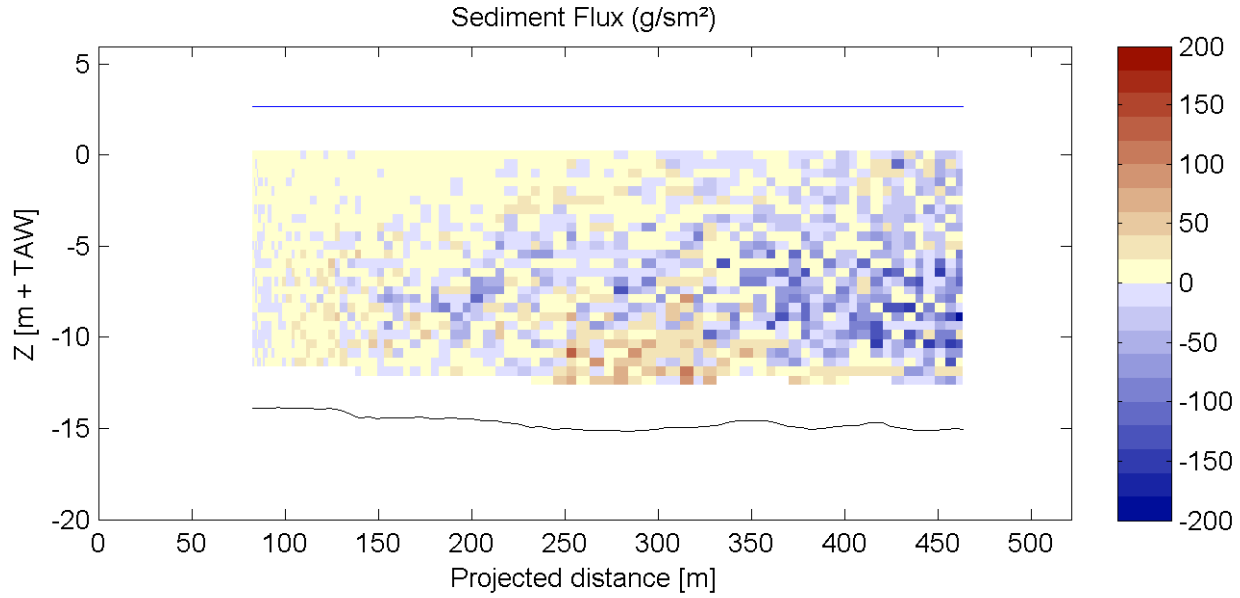
In association with : WL | delft hydraulics, GEMS International

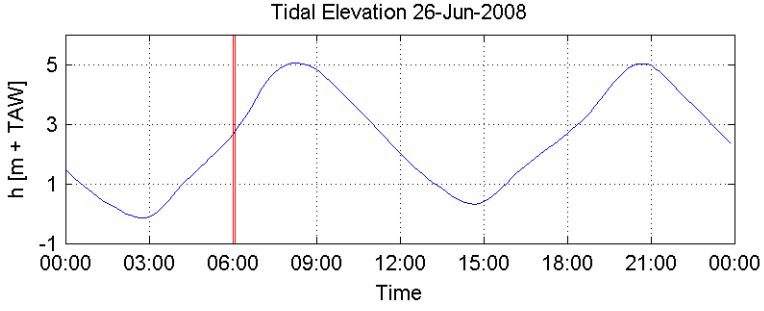
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6007DGDtlr_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

06:01 - 06:05

Time after HW [HH:MM]

-2:16

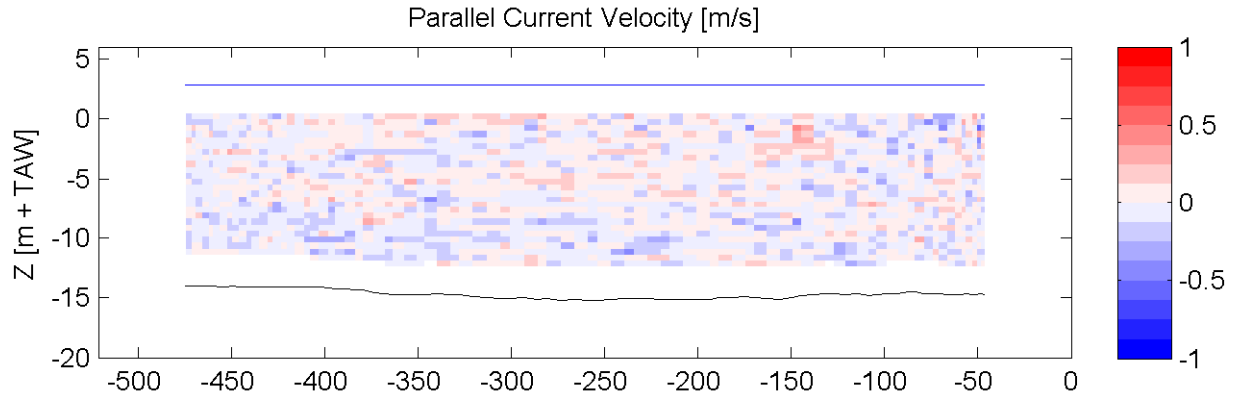
Data Processed by: IMDC

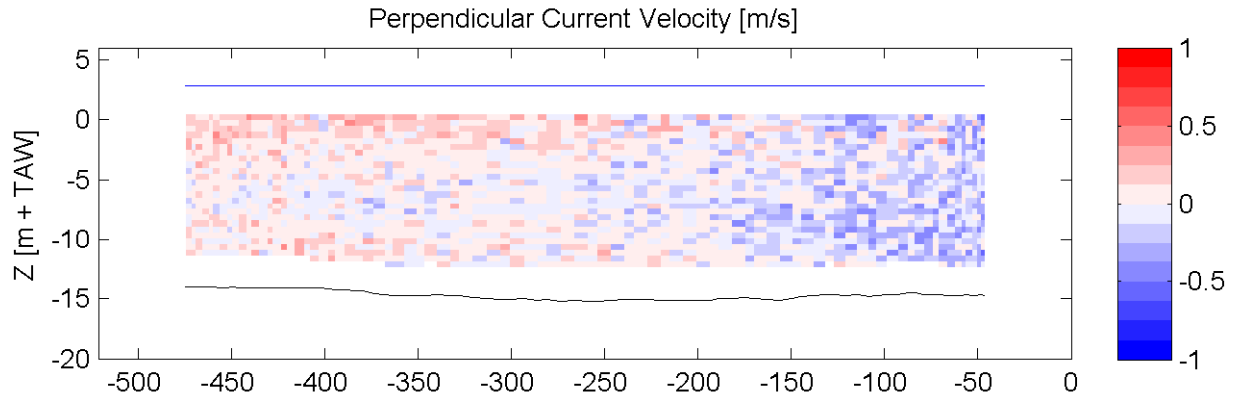
In association with : WL | delft hydraulics, GEMS International

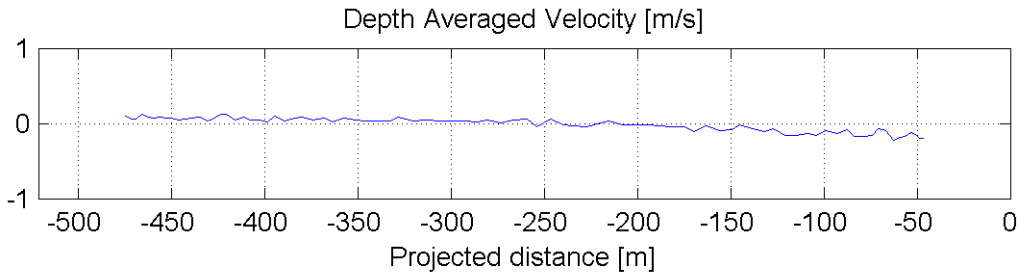
I/RA/11283/08.082/MSA

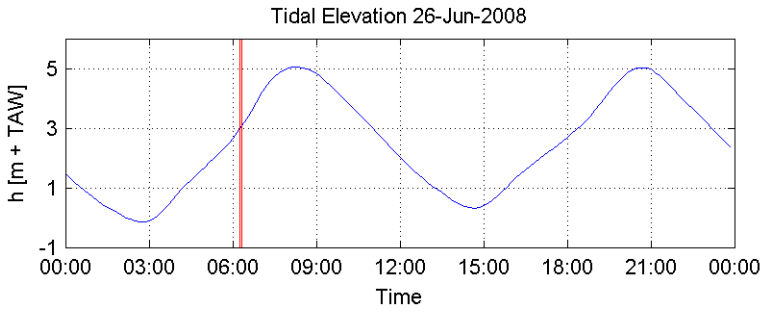
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6009DGDtrl_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

06:14 - 06:18

Time after HW [HH:MM]

-2:03

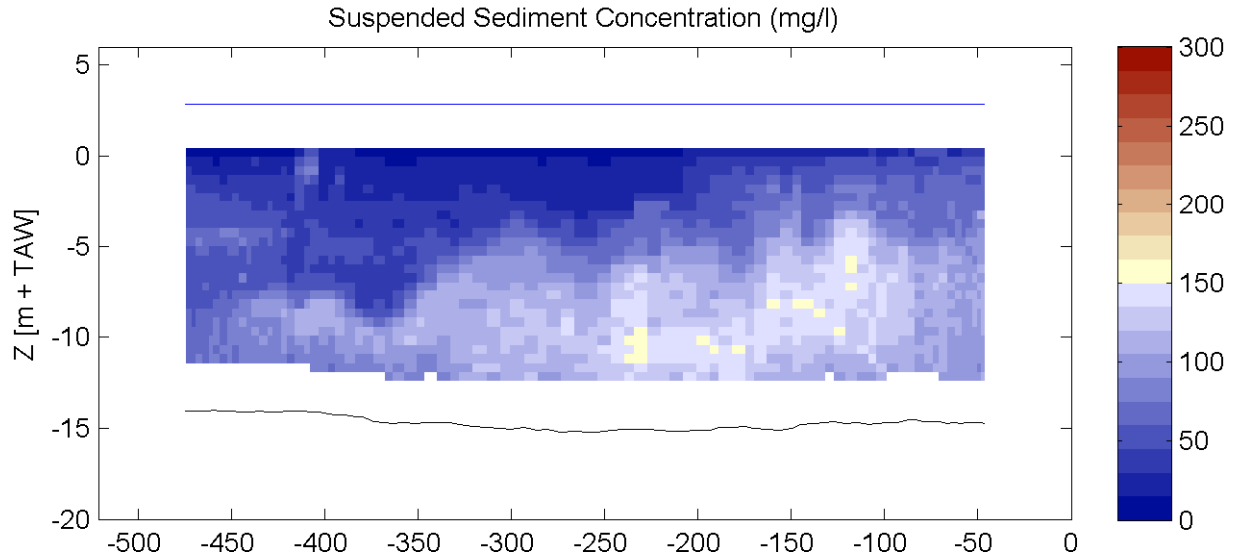
Data Processed by: IMDC

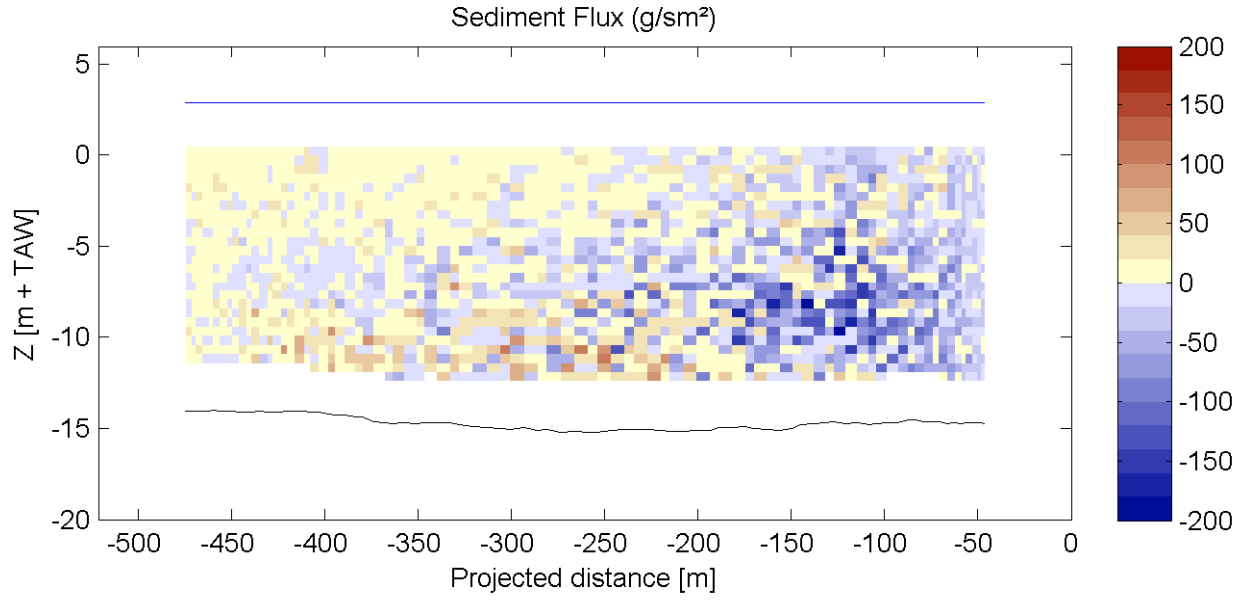
In association with : w.l | delft hydraulics, GEMS

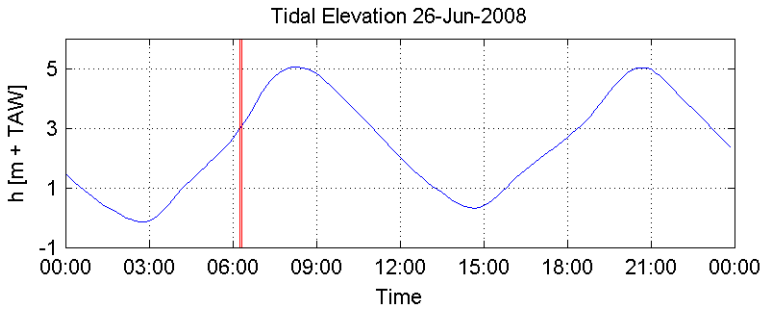
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6009DGDtrl_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

06:14 - 06:18

Time after HW [HH:MM]

-2:03

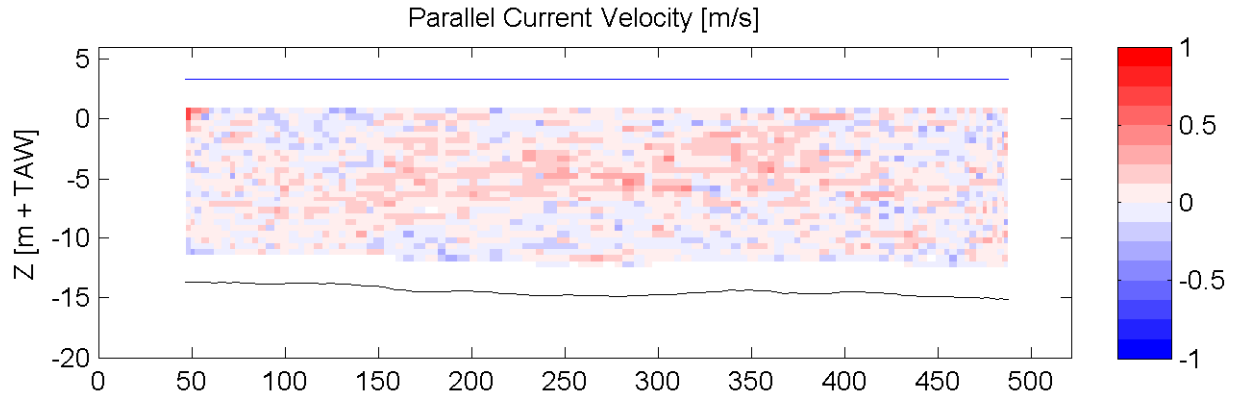
Data Processed by: IMDC

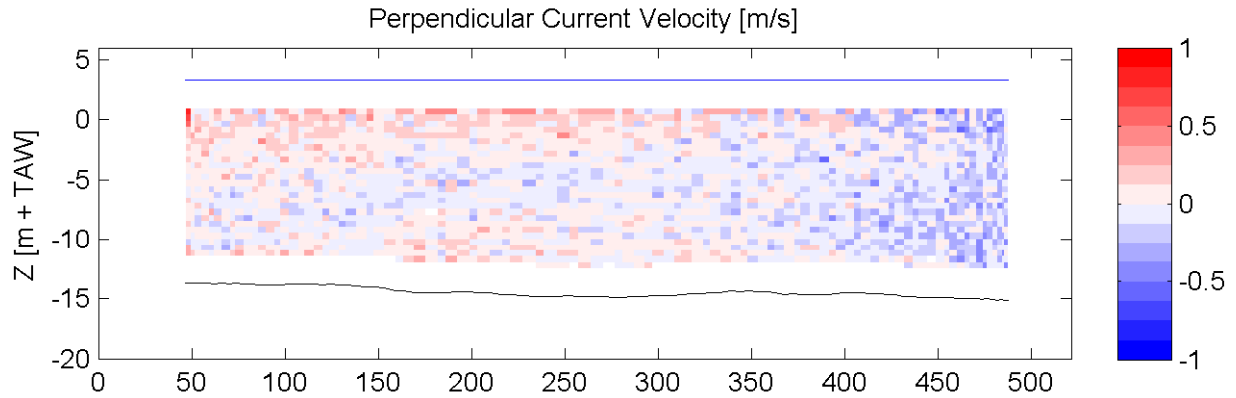
In association with : WL | delft hydraulics, GEMS International

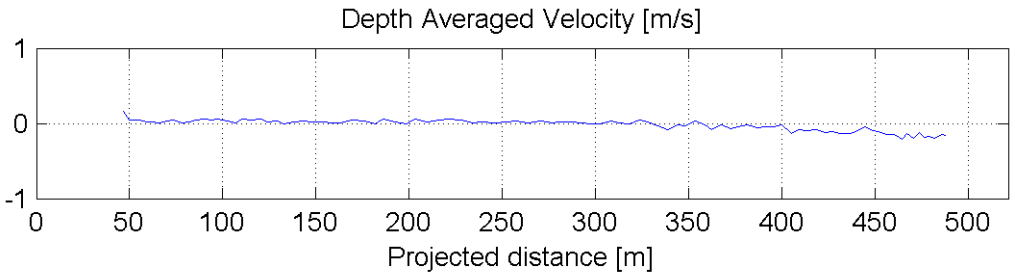
I/RA/11283/08.082/MSA

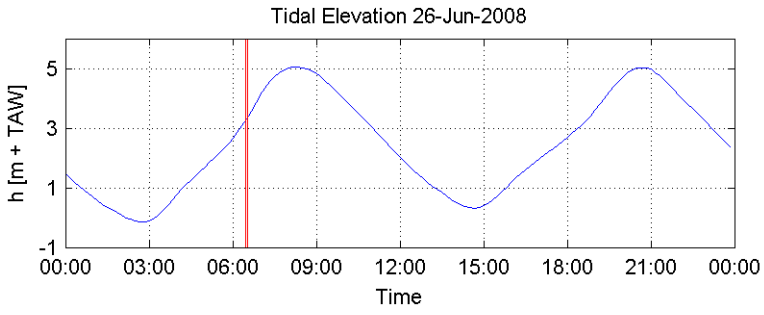
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6011DGDtlr.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

06:27 - 06:31

Time after HW [HH:MM]

-1:50

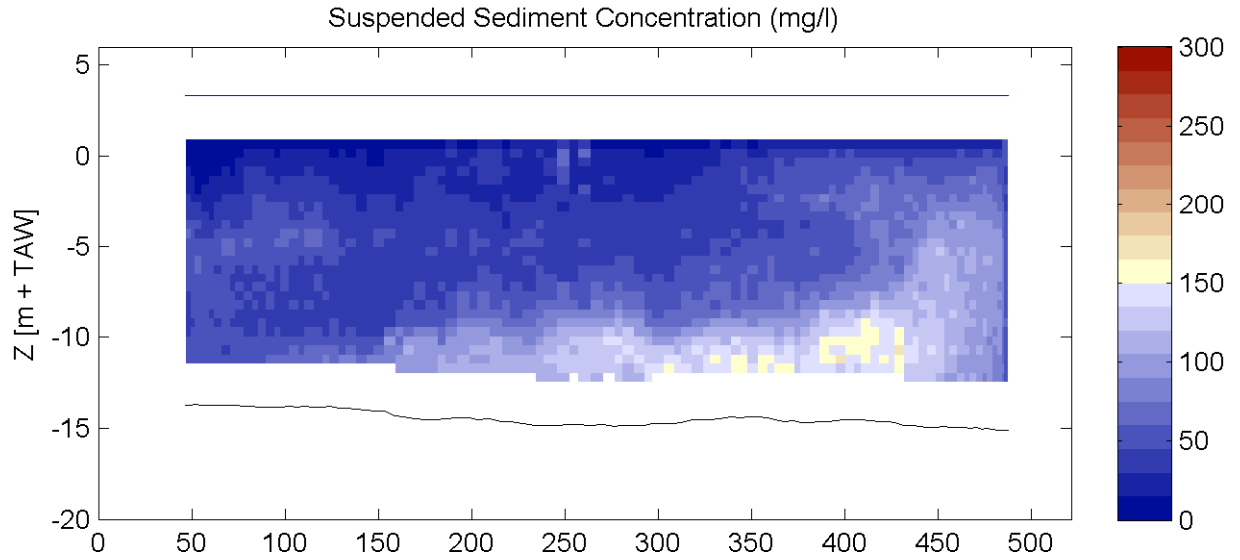
Data Processed by: IMDC

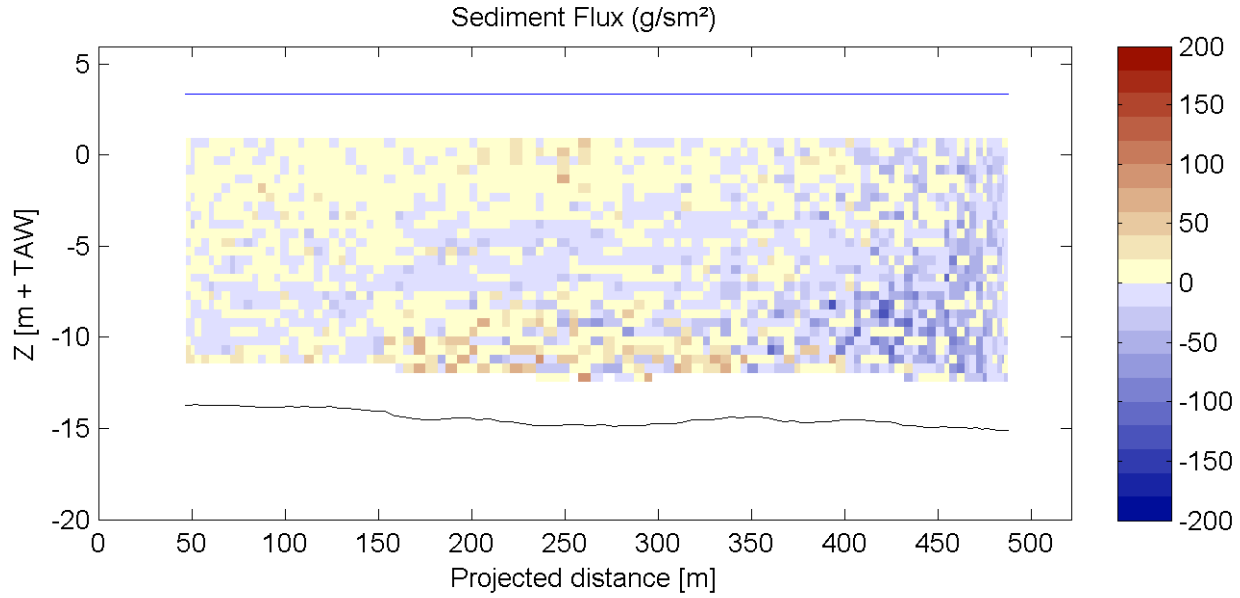
In association with : WL | delft hydraulics, GEMS International

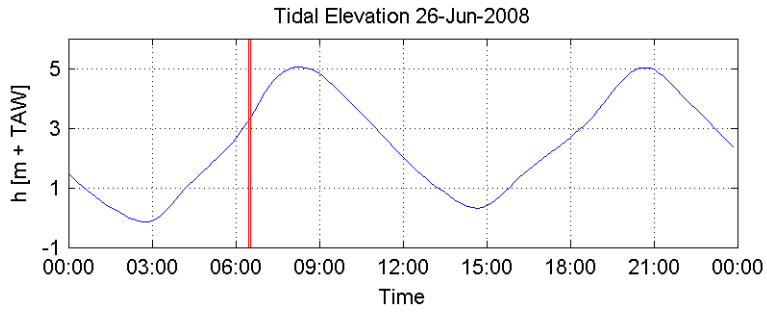
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6011DGDtlr.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

06:27 - 06:31

Time after HW [HH:MM]

-1:50

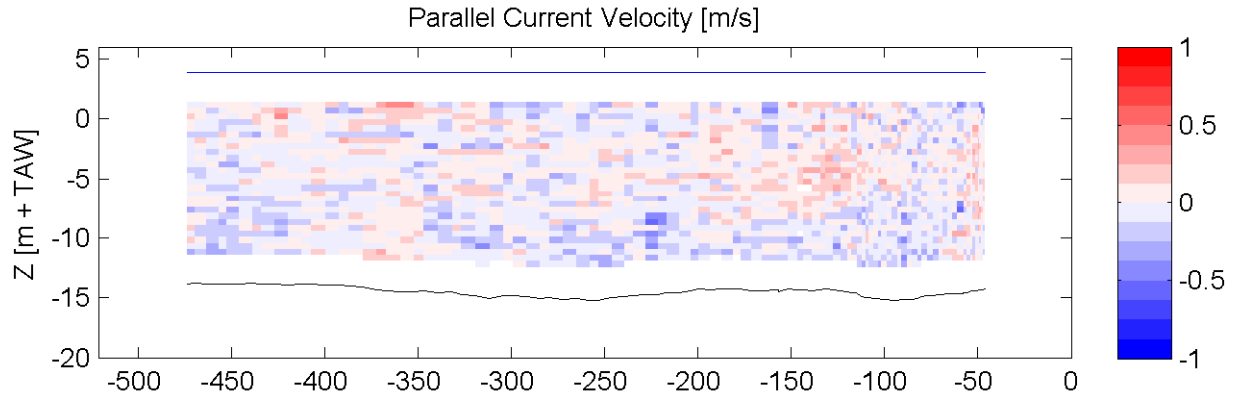
Data Processed by: IMDC

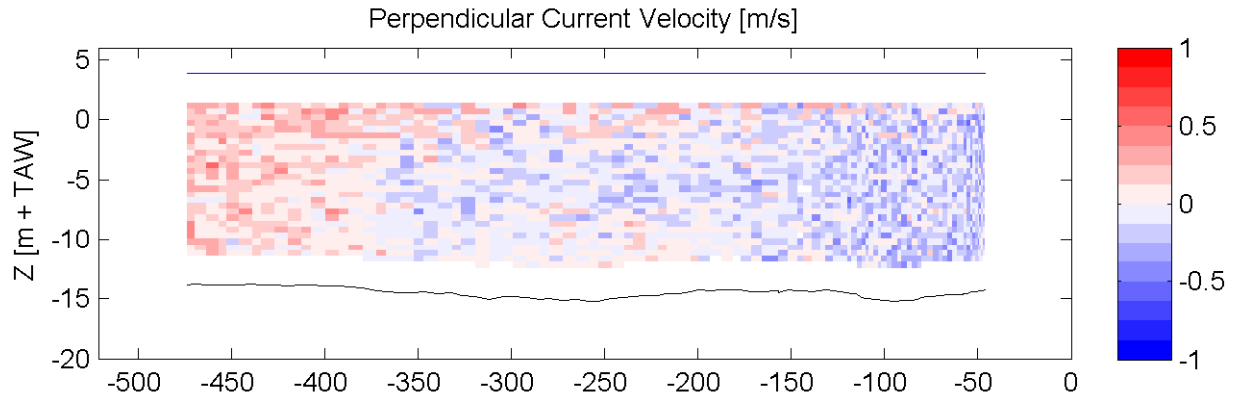
In association with : WL | delft hydraulics, GEMS International

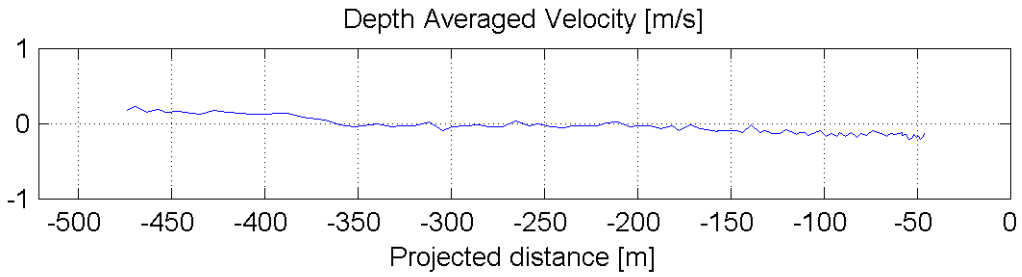
I/RA/11283/08.082/MSA

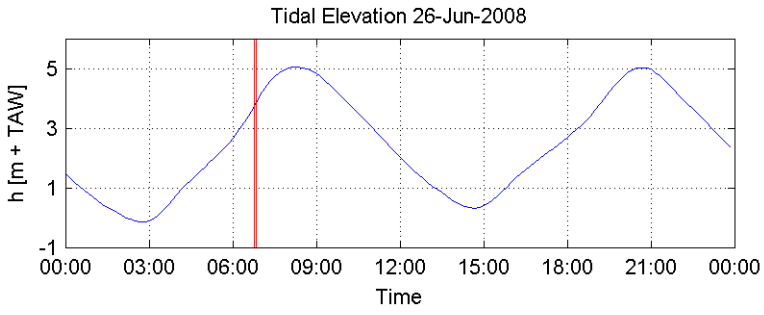
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6013DGDtrl.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

06:46 - 06:50

Time after HW [HH:MM]

-1:31

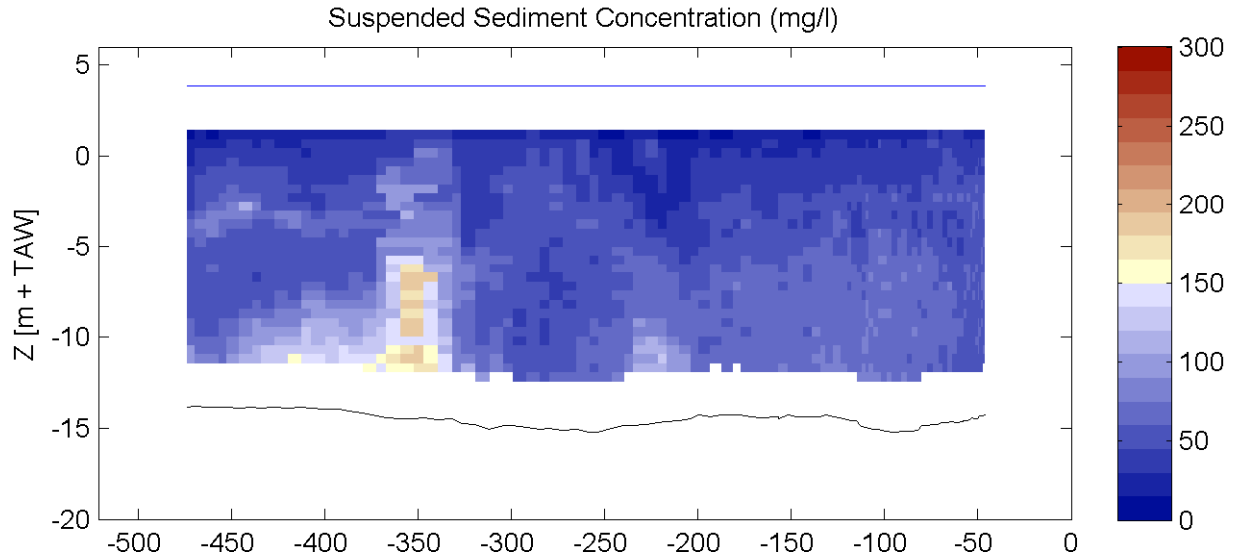
Data Processed by: IMDC

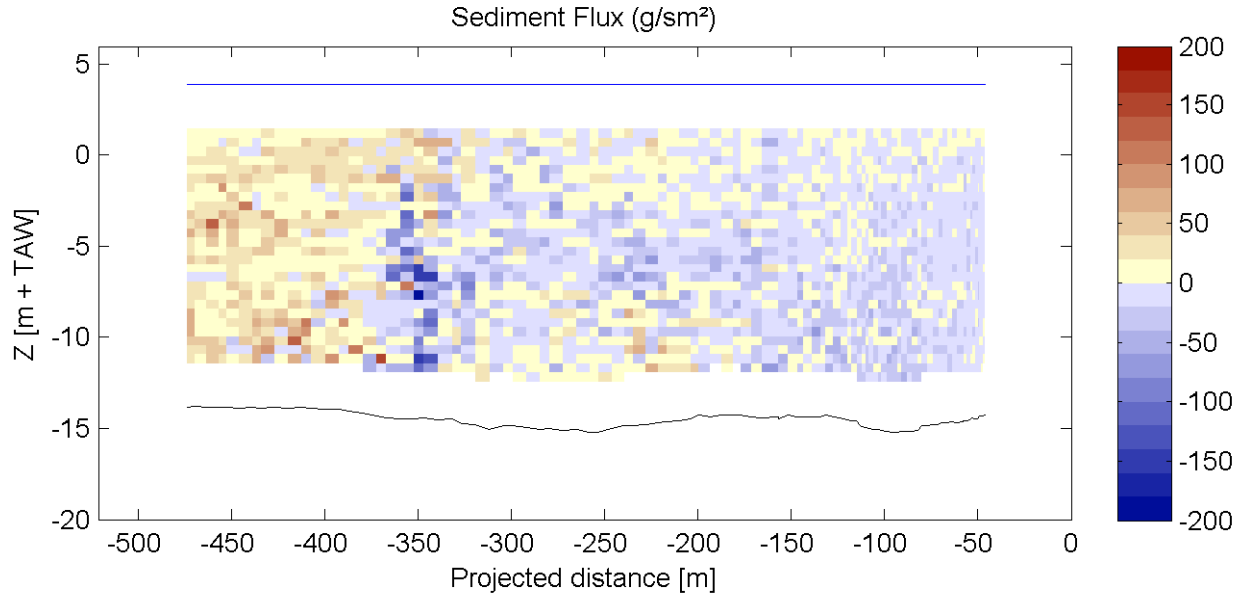
In association with : w.l | delft hydraulics, GEMS

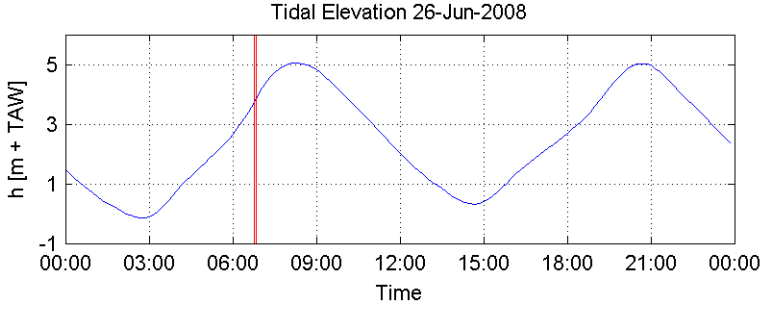
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6013DGDtrl.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

06:46 - 06:50

Time after HW [HH:MM]

-1:31

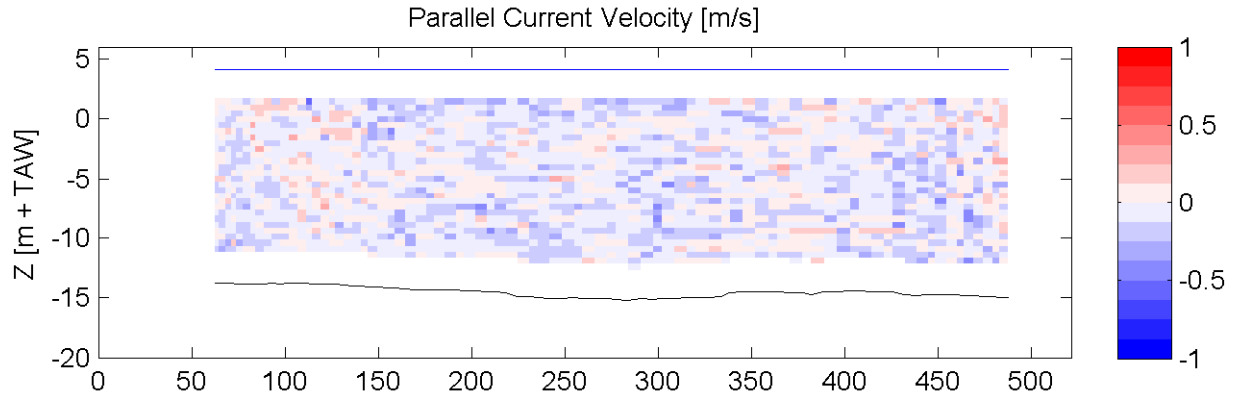
Data Processed by: IMDC

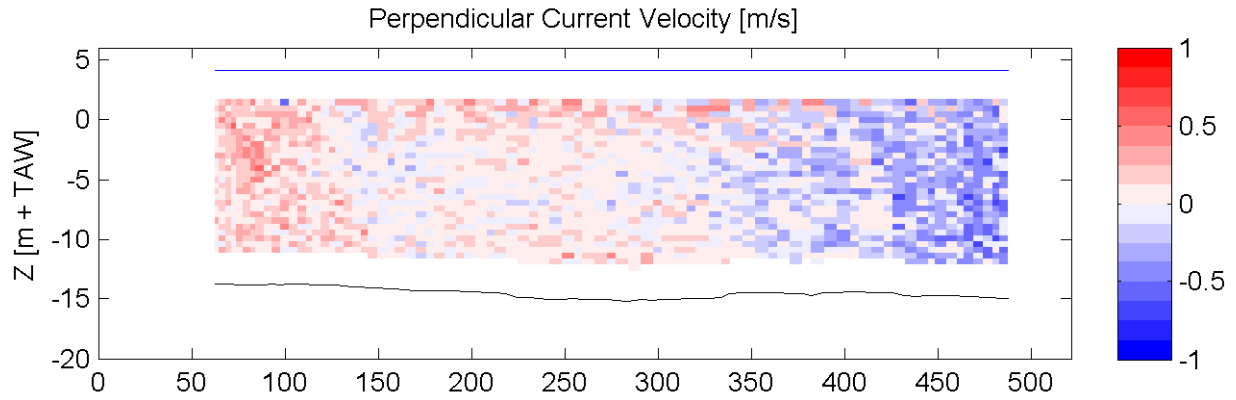
In association with : WL | delft hydraulics, GEMS International

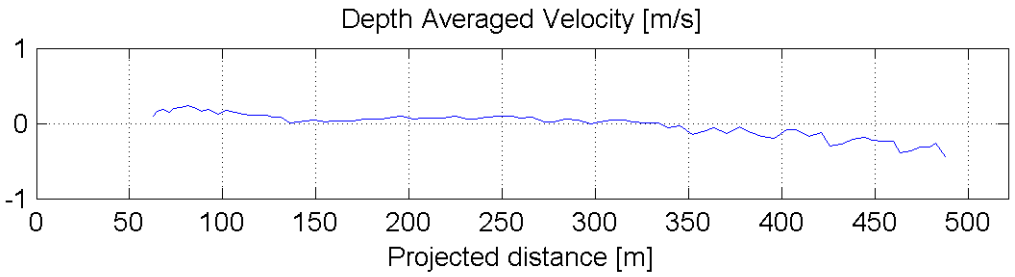
I/RA/11283/08.082/MSA

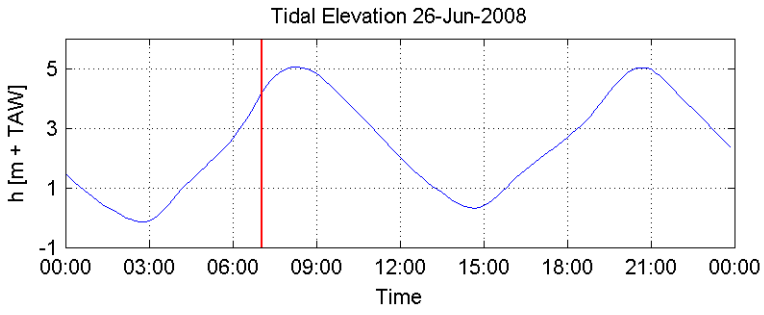
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6015DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

07:00 - 07:04

Time after HW [HH:MM]

-1:17

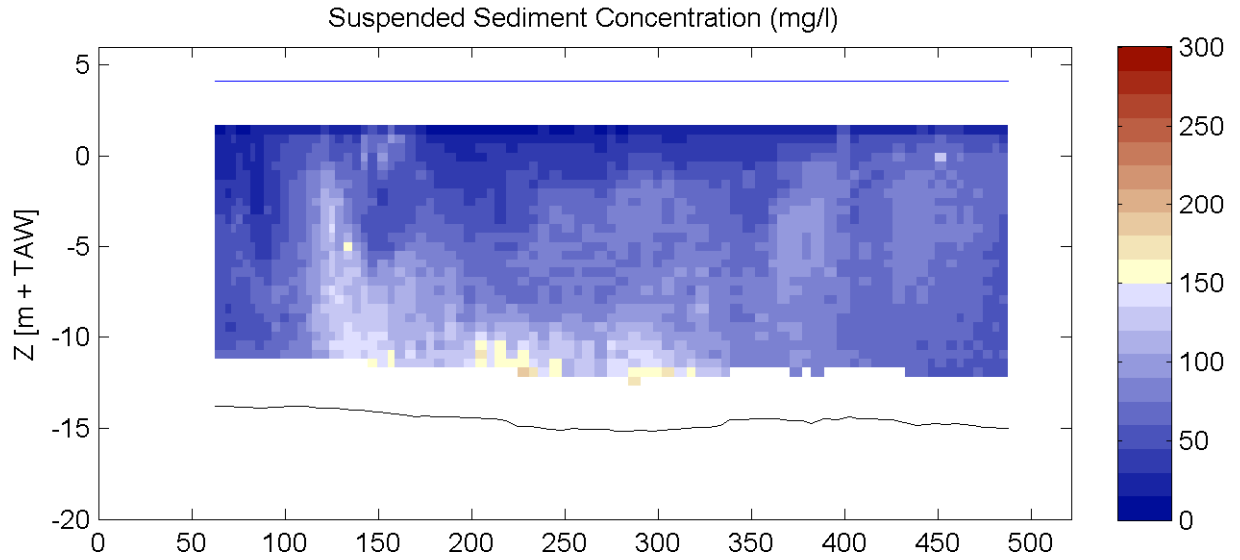
Data Processed by: IMDC

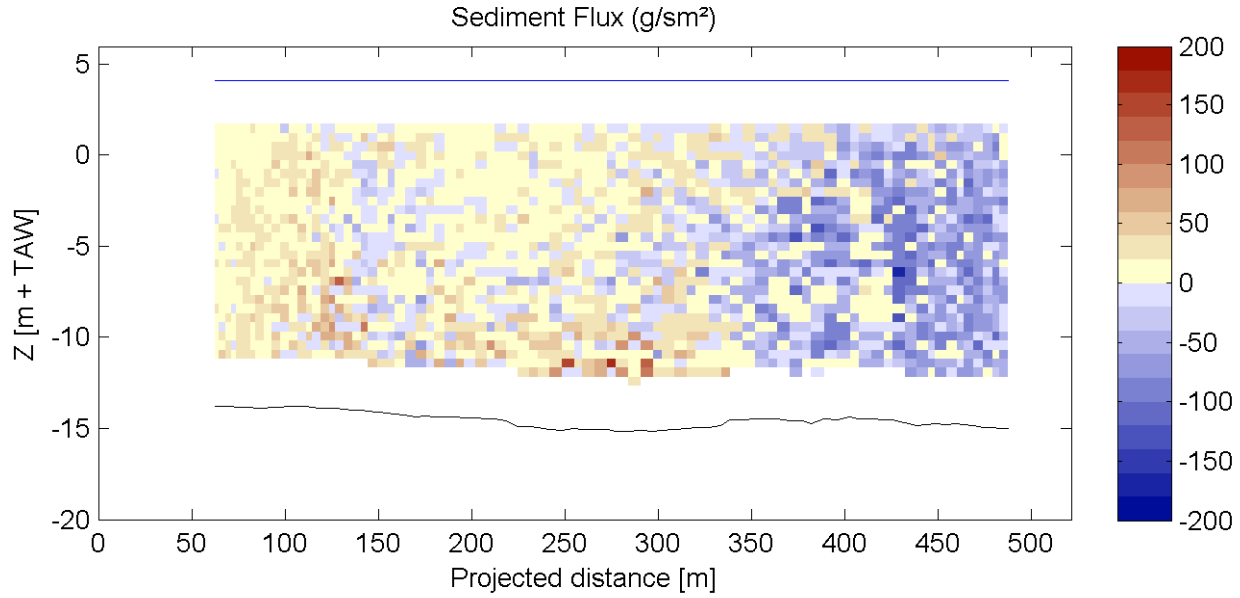
In association with : WL | delft hydraulics, GEMS International

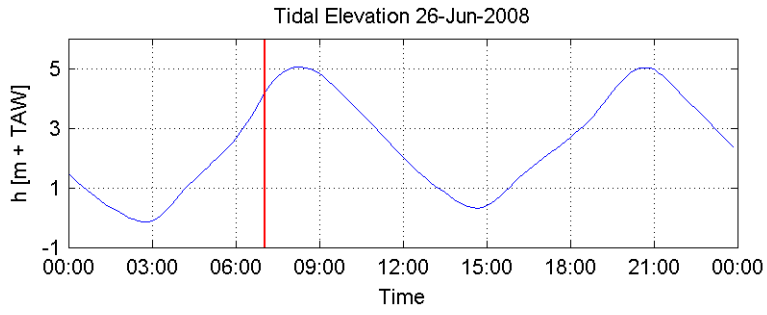
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6015DGDtlr_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

07:00 - 07:04

Time after HW [HH:MM]

-1:17

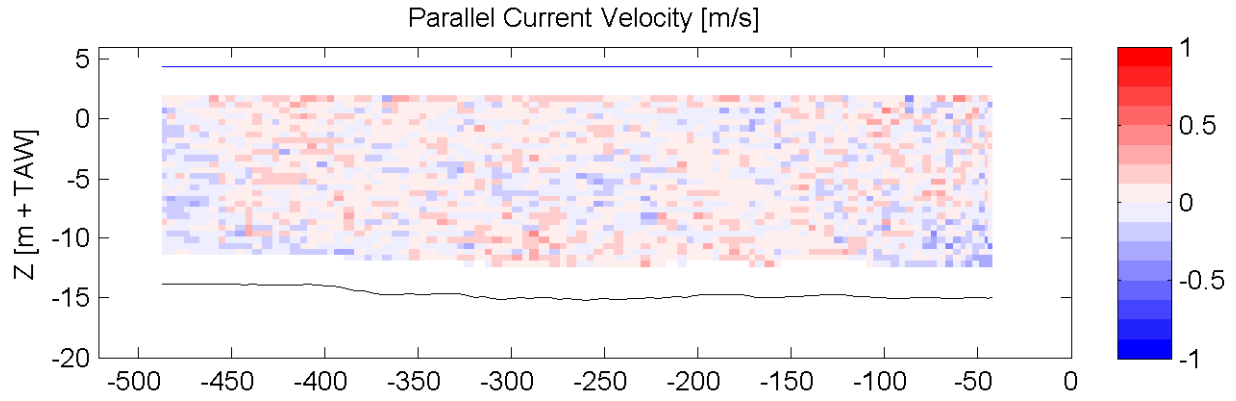
Data Processed by: IMDC

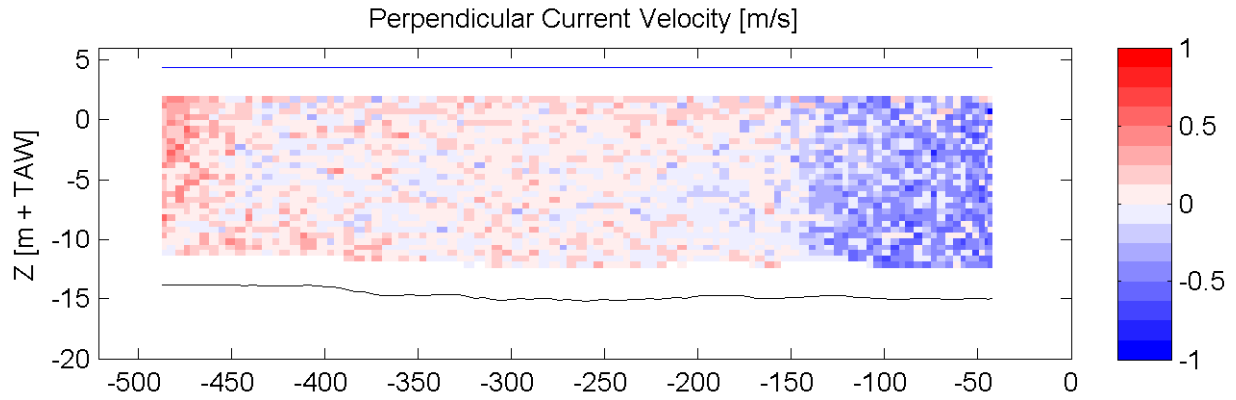
In association with : WL | delft hydraulics, GEMS International

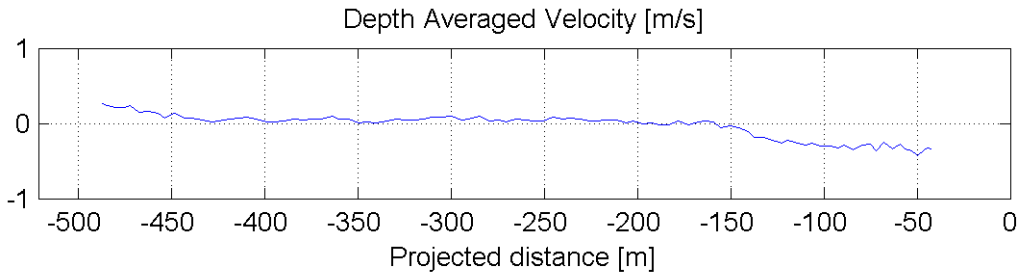
I/RA/11283/08.082/MSA

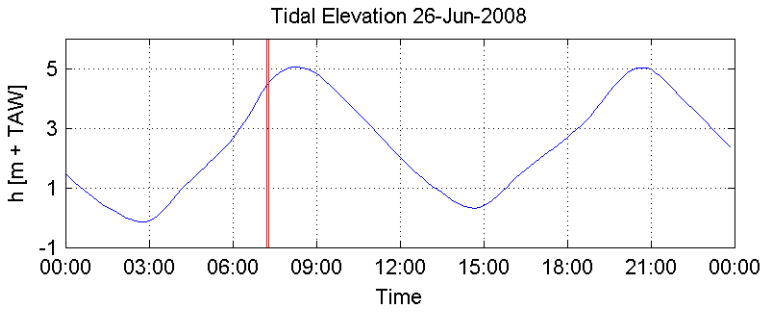
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6017DGDtrl_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

07:12 - 07:17

Time after HW [HH:MM]

-1:05

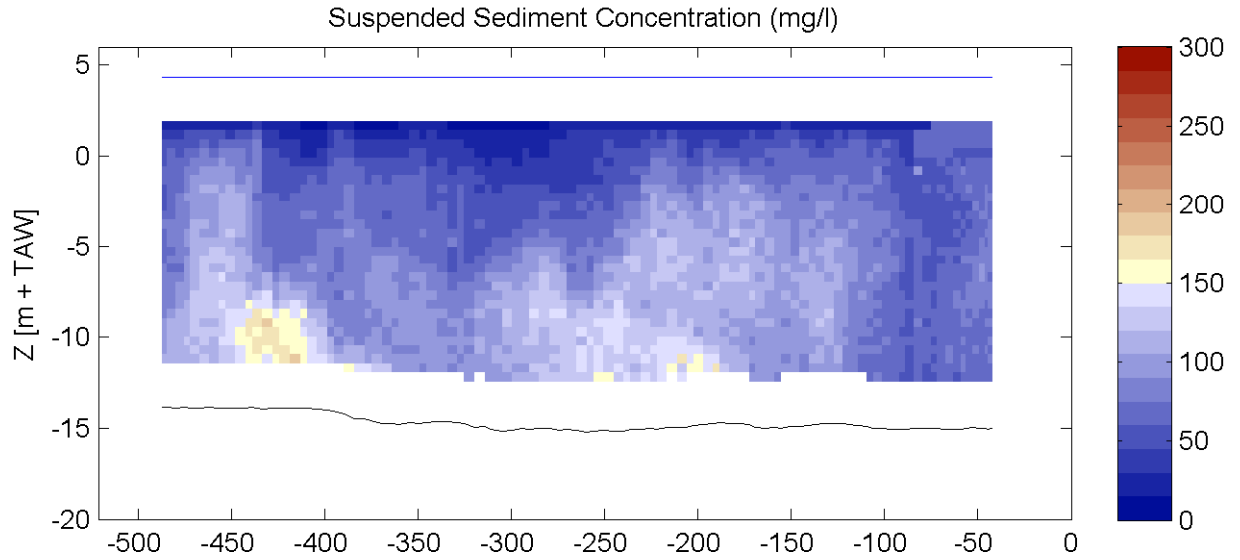
Data Processed by: IMDC

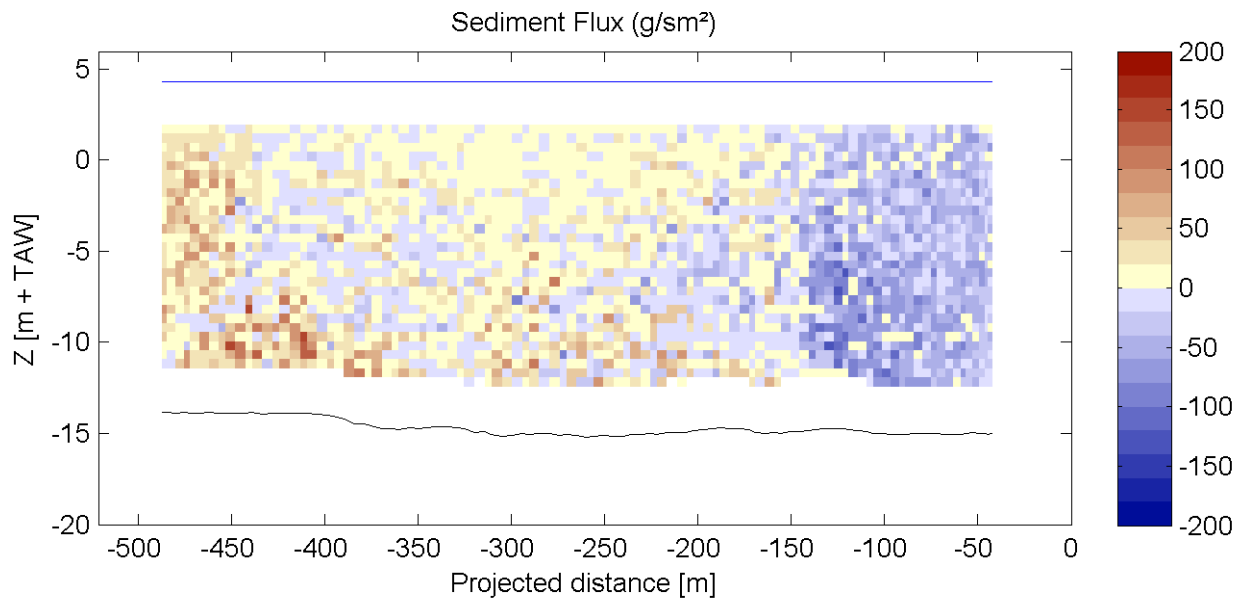
In association with : w.l | delft hydraulics, GEMS

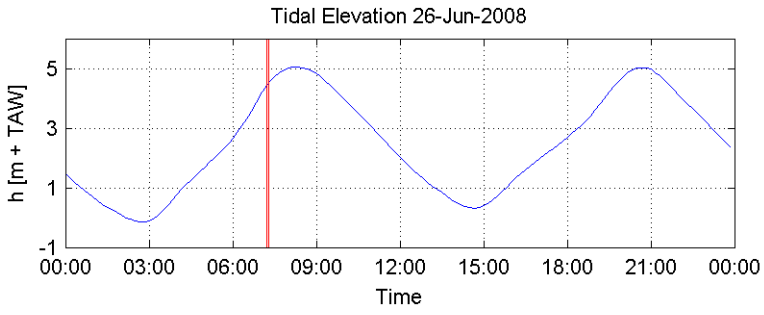
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6017DGDtrl_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

07:12 - 07:17

Time after HW [HH:MM]

-1:05

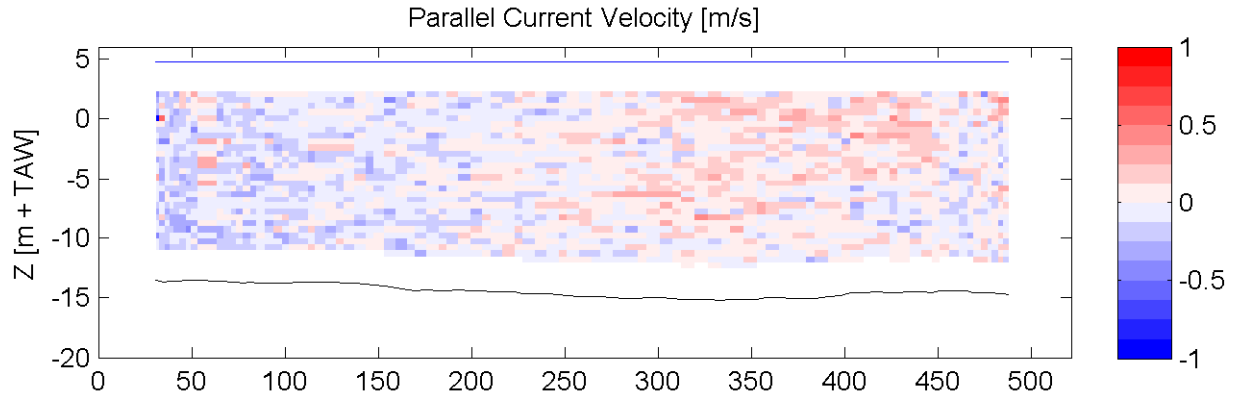
Data Processed by: IMDC

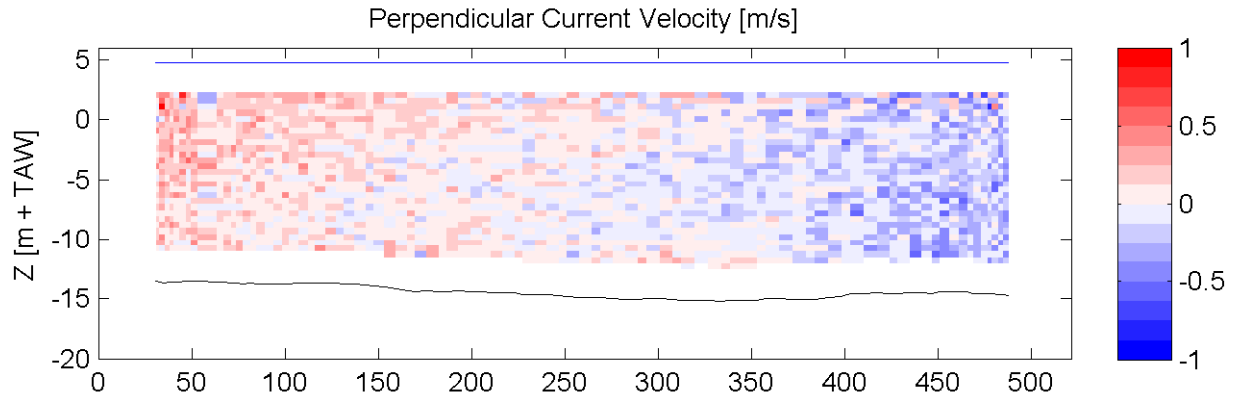
In association with : WL | delft hydraulics, GEMS International

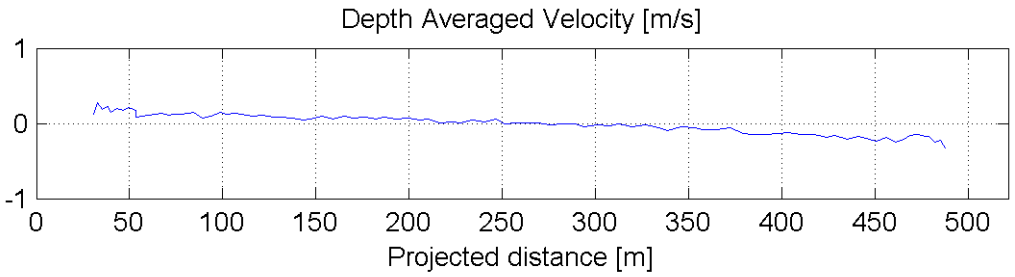
I/RA/11283/08.082/MSA

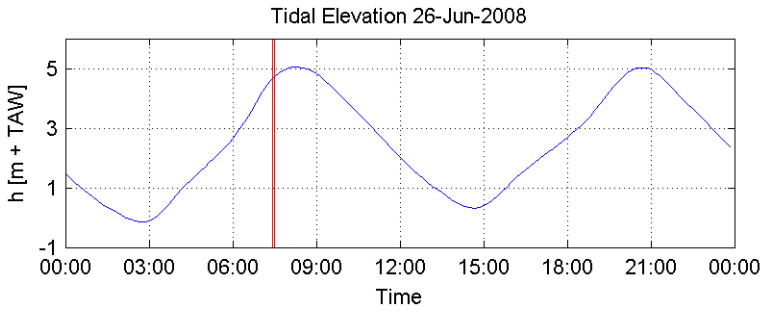
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6019DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

07:26 - 07:30

Time after HW [HH:MM]

-0:51

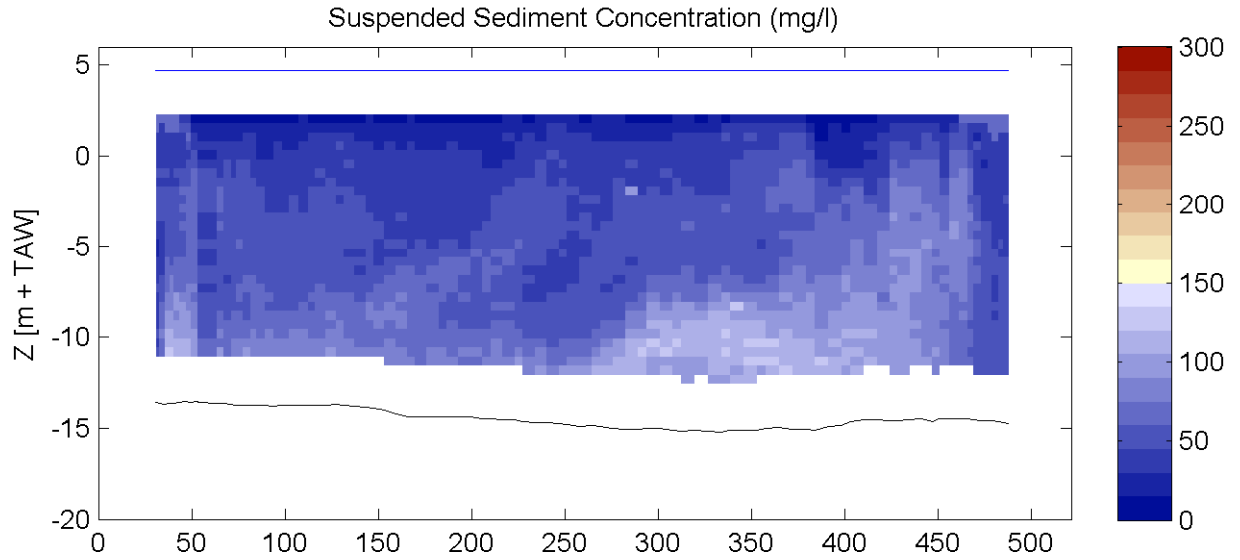
Data Processed by: IMDC

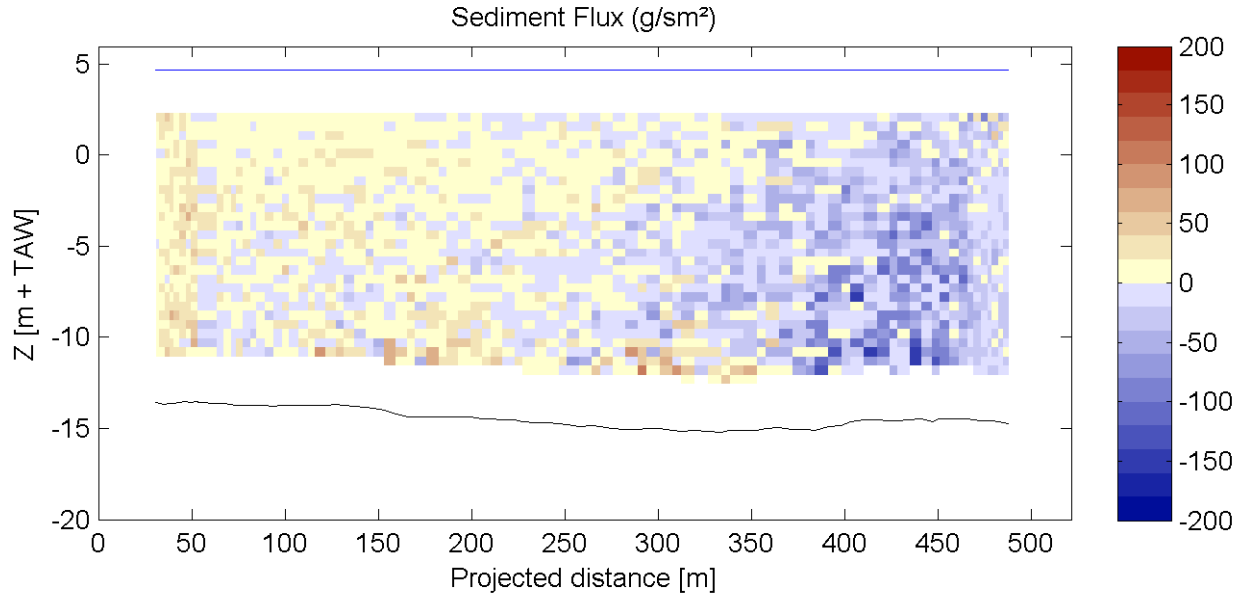
In association with : WL | delft hydraulics, GEMS International

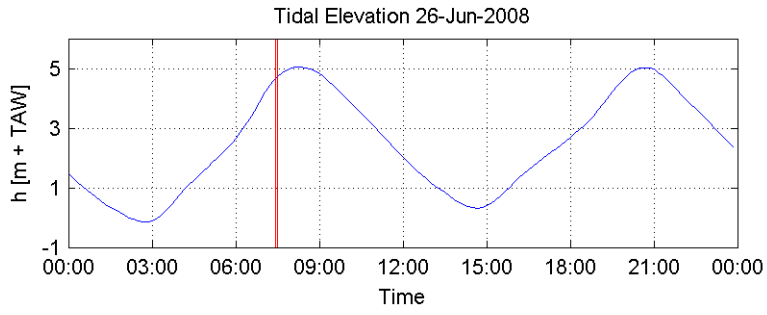
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6019DGDtlr_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

07:26 - 07:30

Time after HW [HH:MM]

-0:51

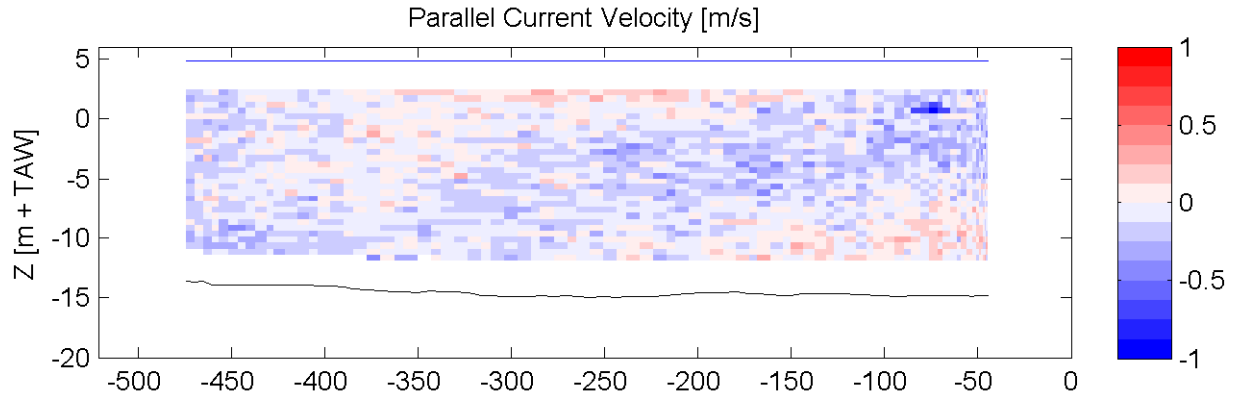
Data Processed by: IMDC

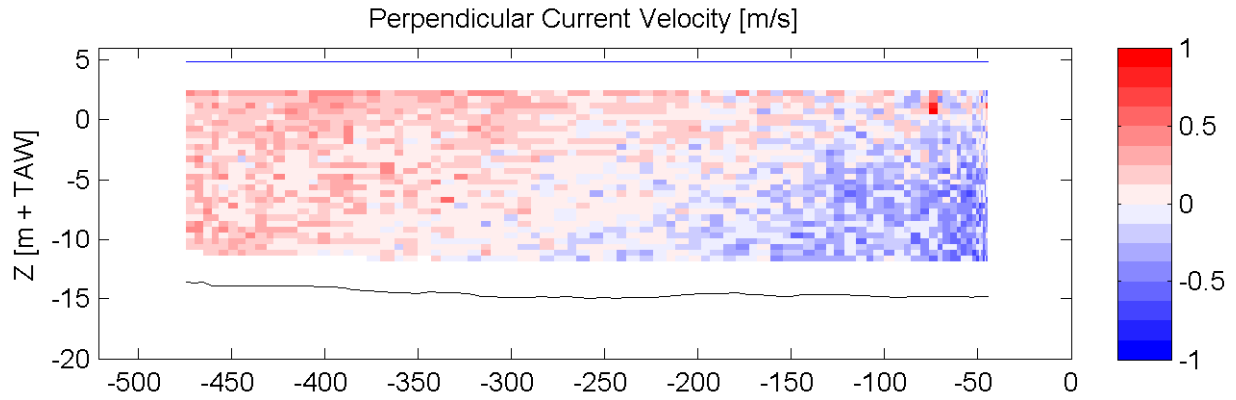
In association with : w.l | delft hydraulics, GEMS International

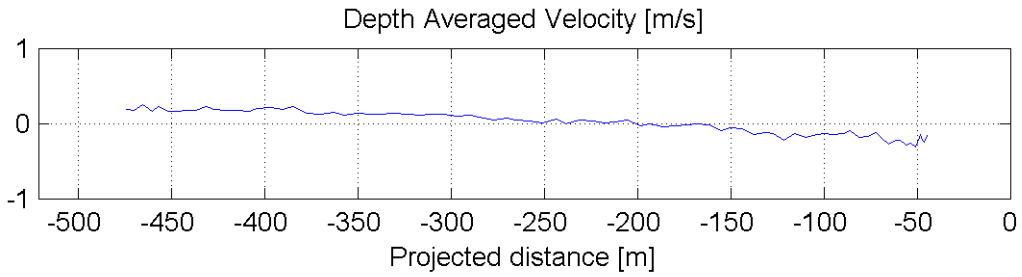
I/RA/11283/08.082/MSA

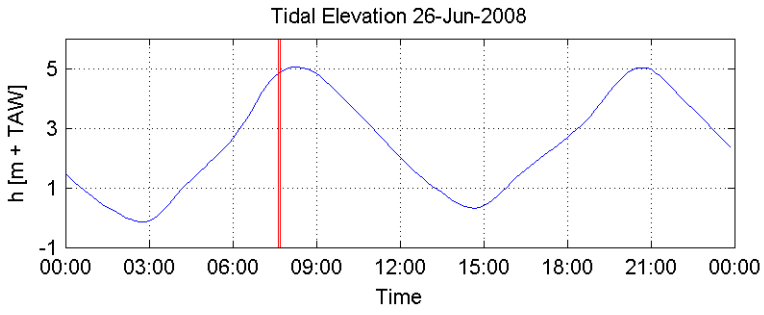
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6021DGDtrl.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

07:39 - 07:42

Time after HW [HH:MM]

-0:39

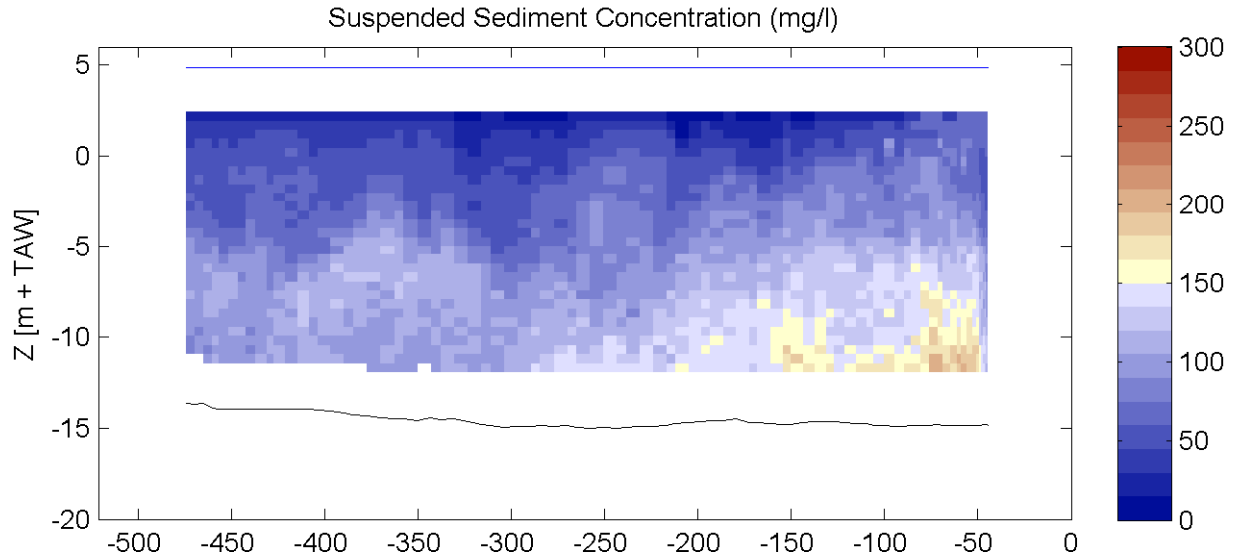
Data Processed by: IMDC

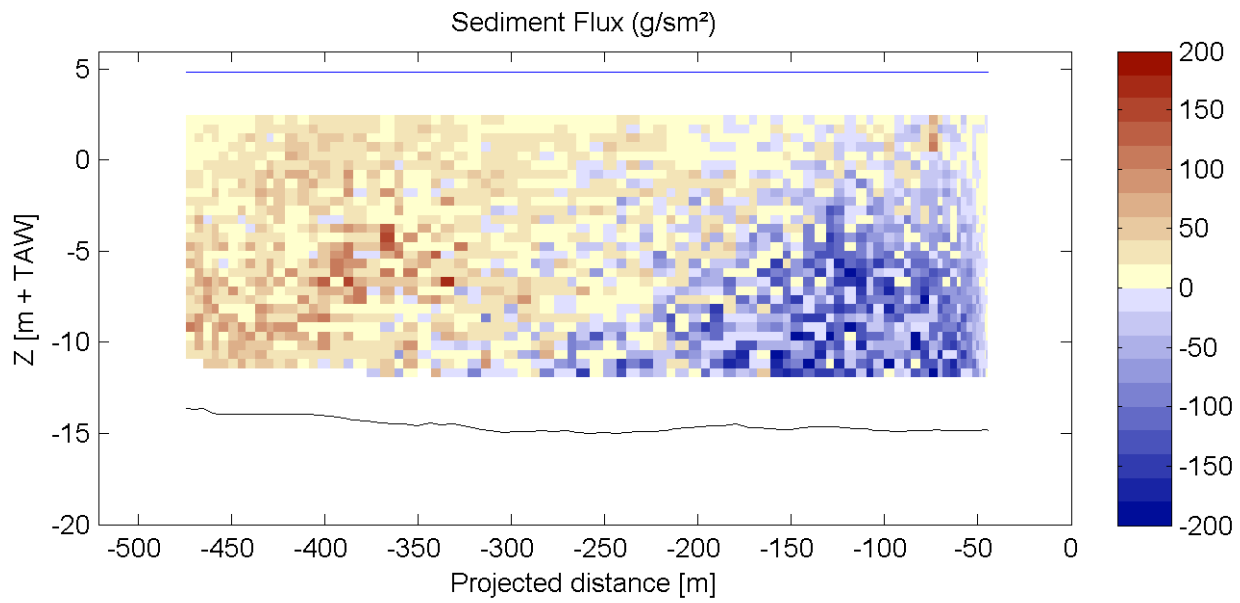
In association with : w.l | delft hydraulics, GEMS International

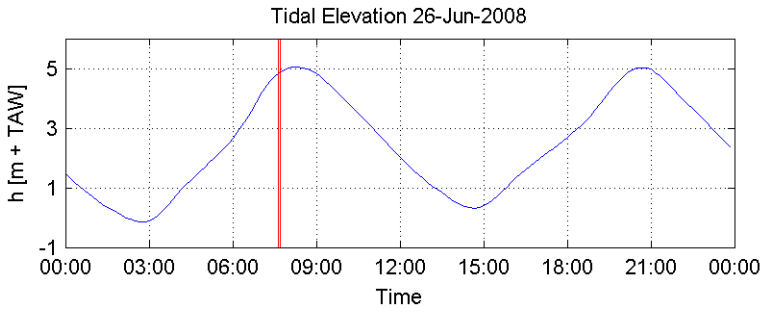
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6021DGDtrl.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

07:39 - 07:42

Time after HW [HH:MM]

-0:39

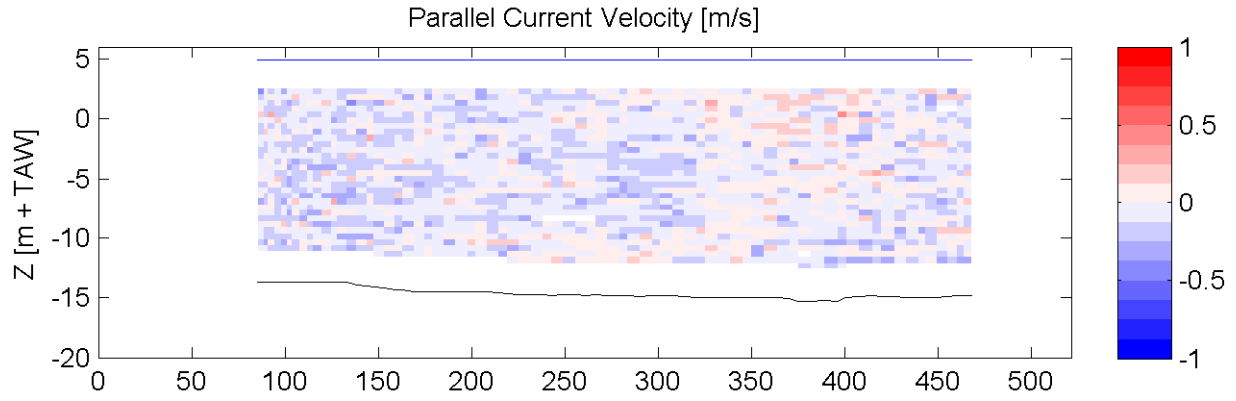
Data Processed by: IMDC

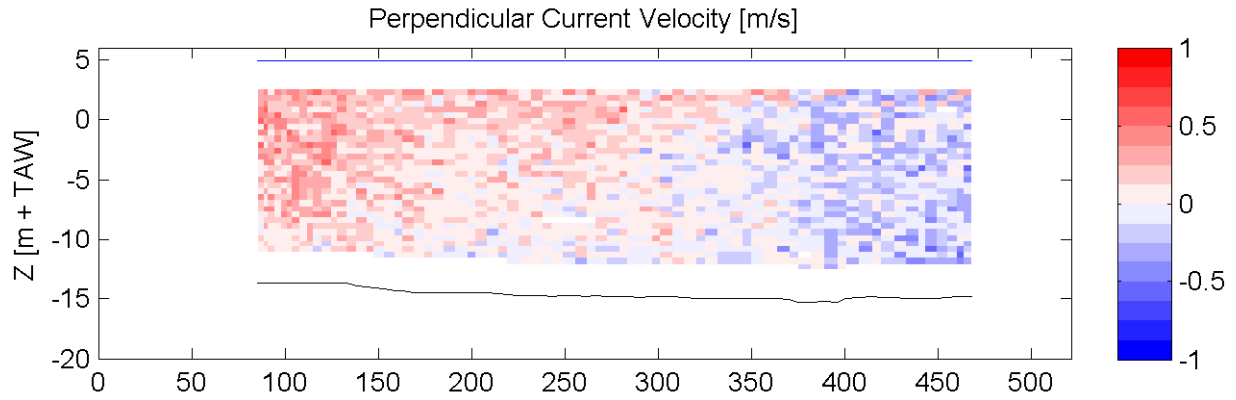
In association with : WL | delft hydraulics, GEMS International

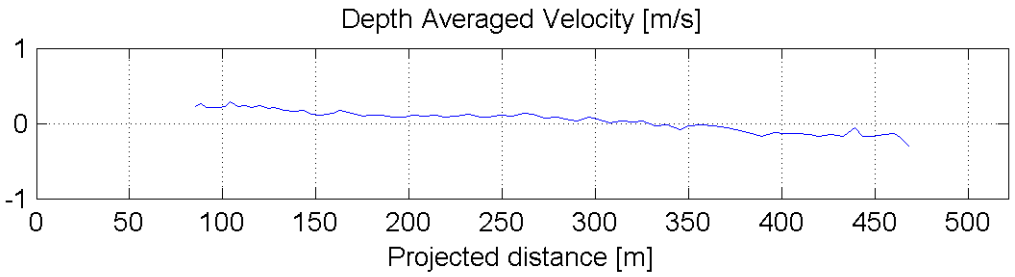
I/RA/11283/08.082/MSA

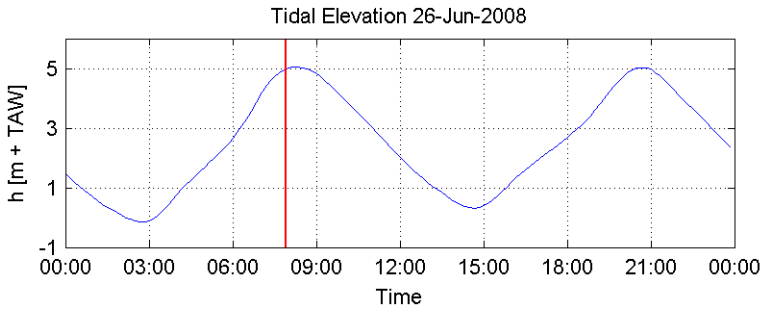
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6023DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

07:52 - 07:55

Time after HW [HH:MM]

-0:26

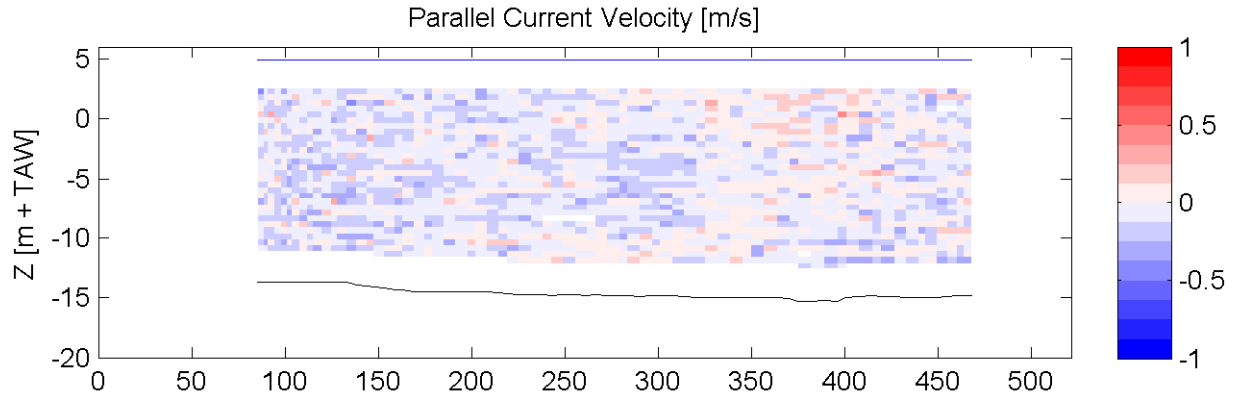
Data Processed by: IMDC

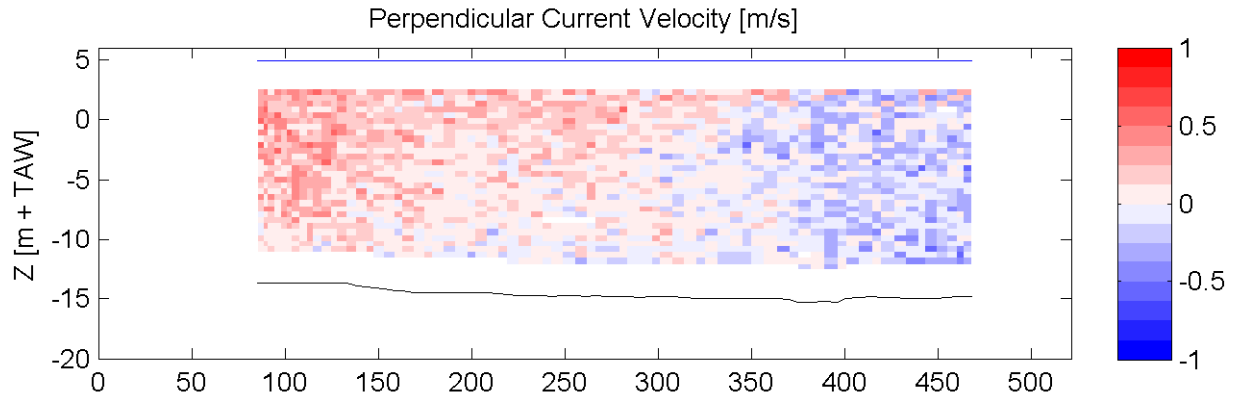
In association with : WL | delft hydraulics, GEMS International

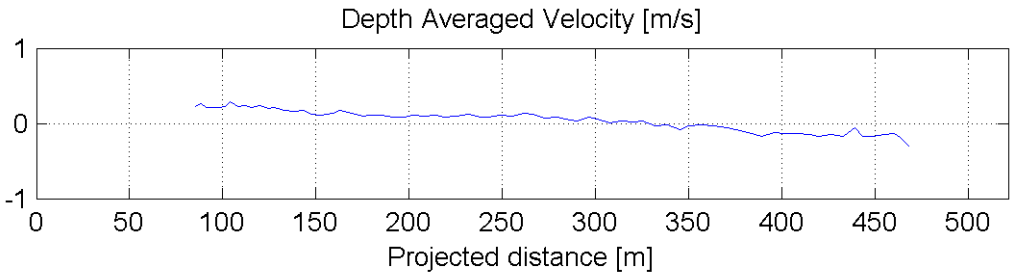
I/RA/11283/08.082/MSA

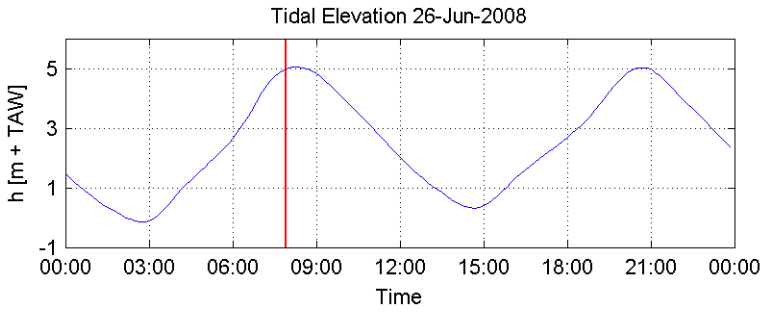
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6023DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

07:52 - 07:55

Time after HW [HH:MM]

-0:26

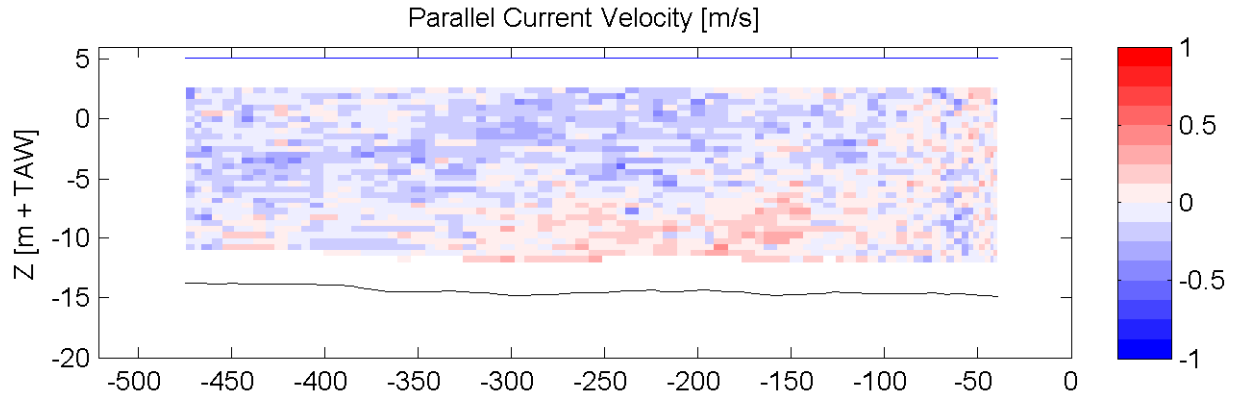
Data Processed by: IMDC

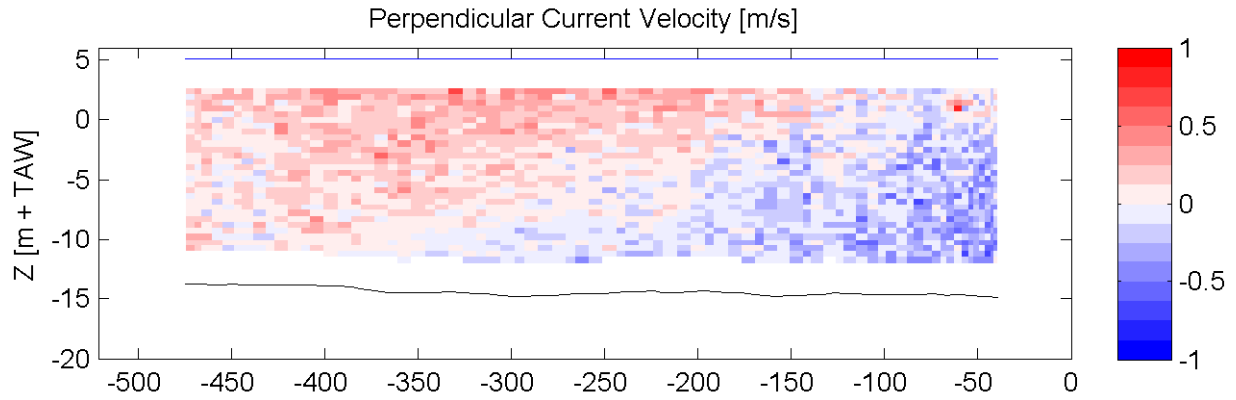
In association with : WL | delft hydraulics, GEMS International

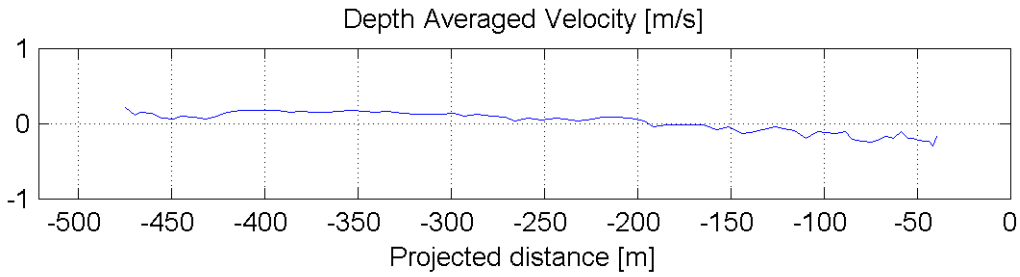
I/RA/11283/08.082/MSA

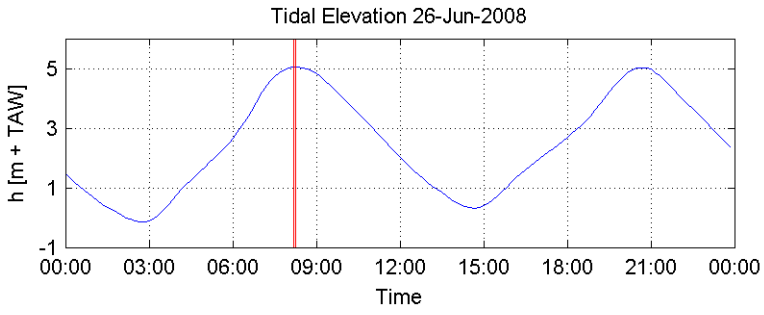
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6025DGDtrl.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

08:11 - 08:15

Time after HW [HH:MM]

-0:06

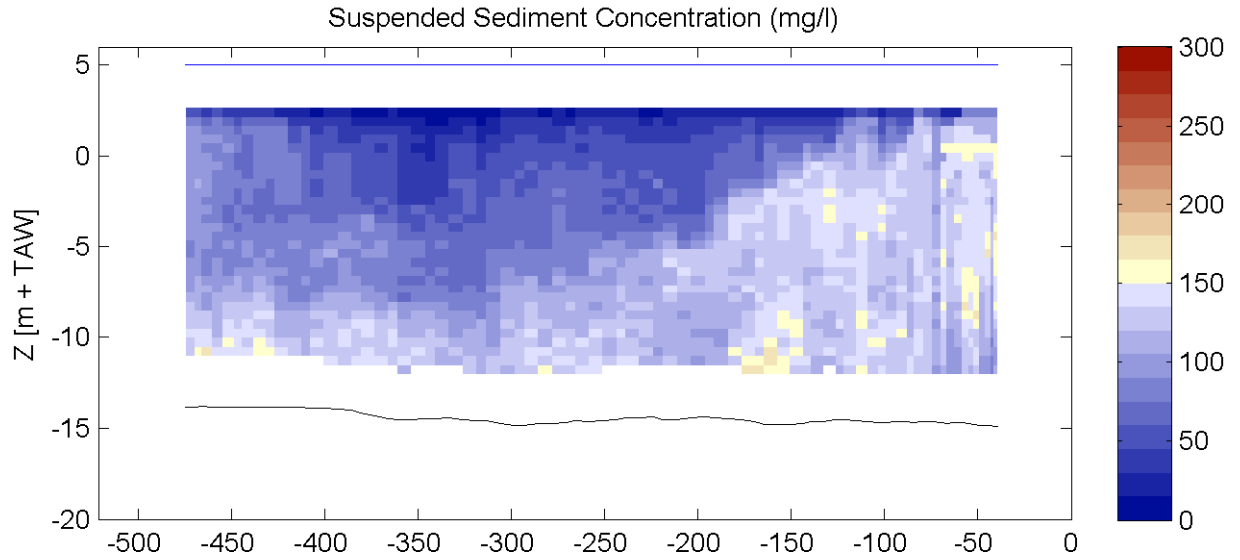
Data Processed by: IMDC

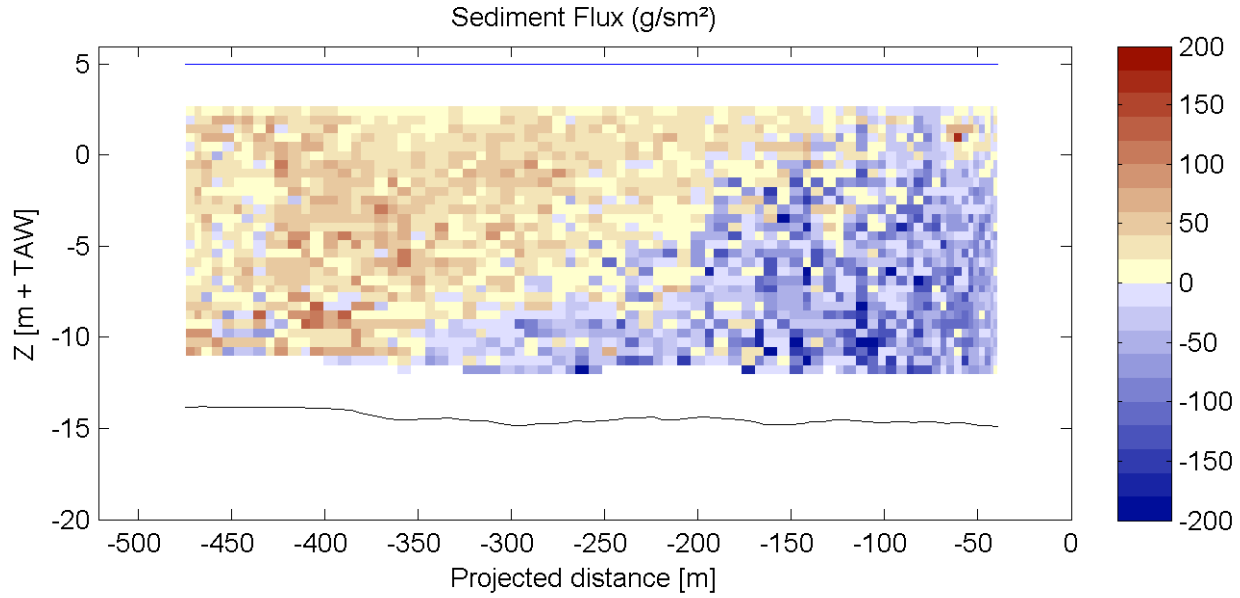
In association with : w.l | delft hydraulics, GEMS International

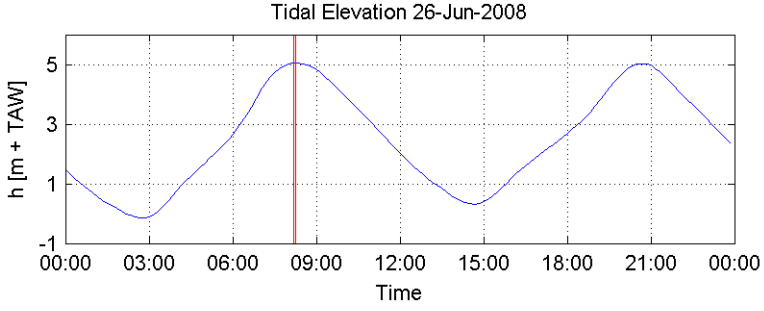
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6025DGDtrl.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

08:11 - 08:15

Time after HW [HH:MM]

-0:06

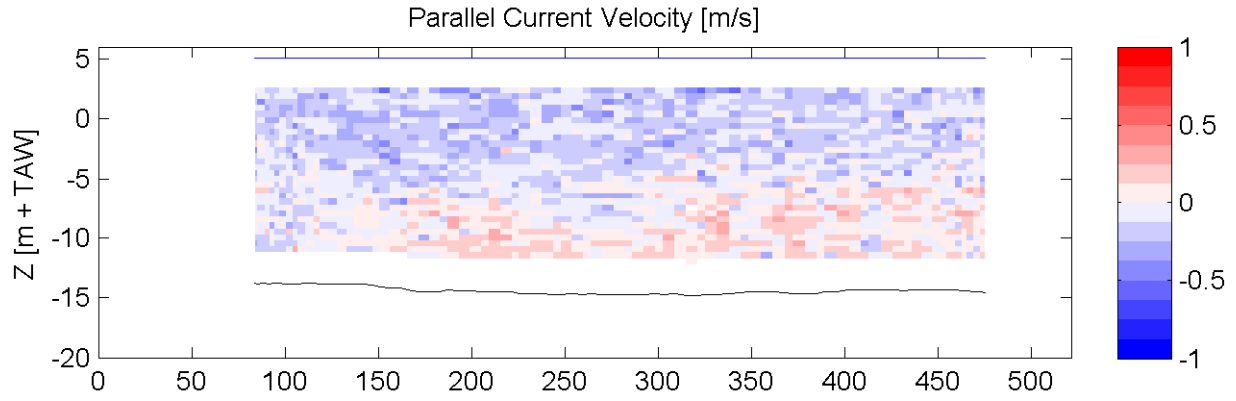
Data Processed by: IMDC

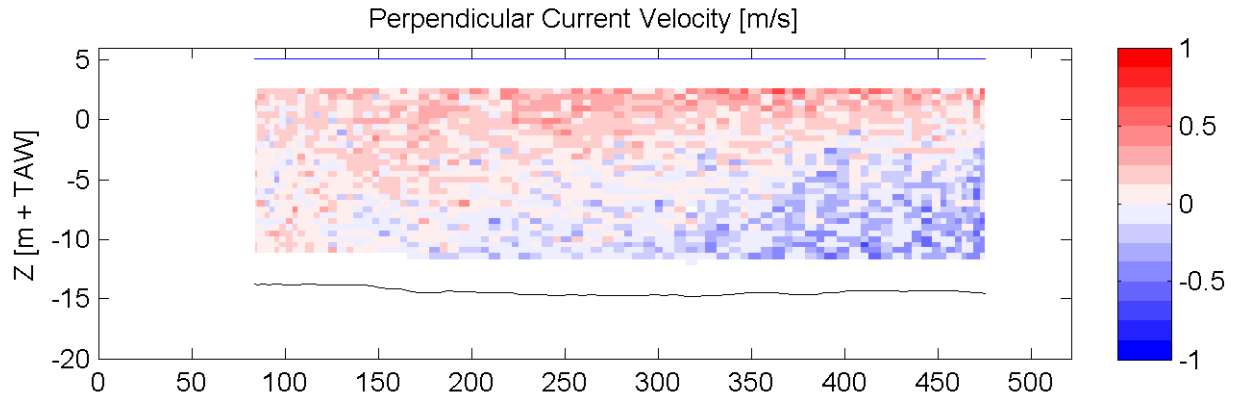
In association with : WL | delft hydraulics, GEMS International

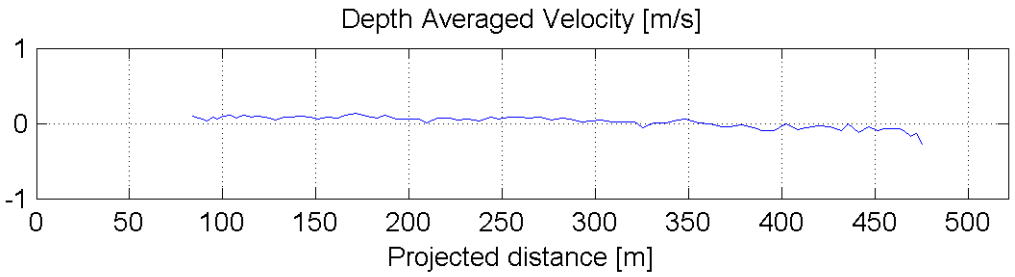
I/RA/11283/08.082/MSA

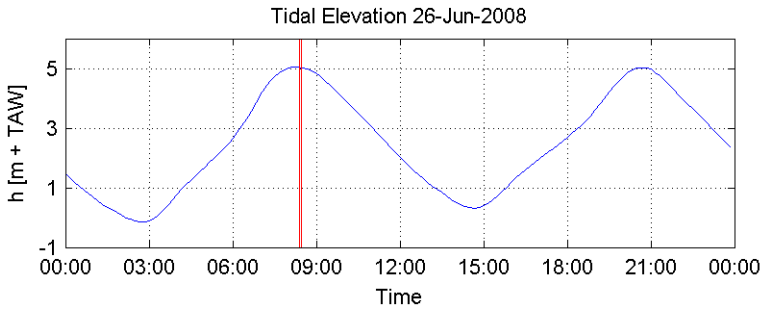
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6027DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

08:24 - 08:27

Time after HW [HH:MM]

0:06

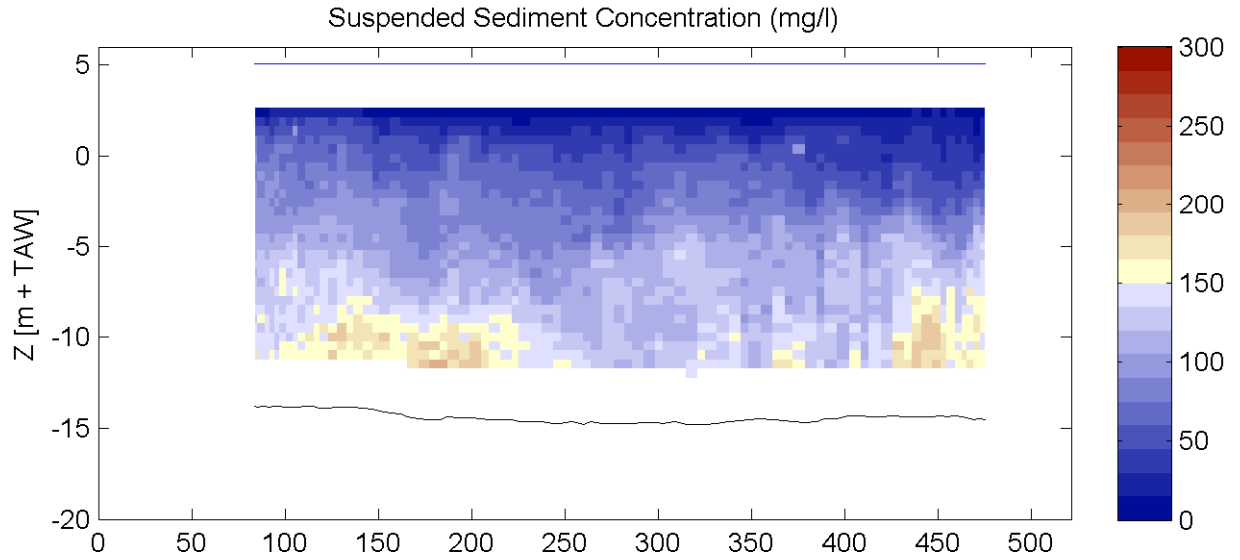
Data Processed by: IMDC

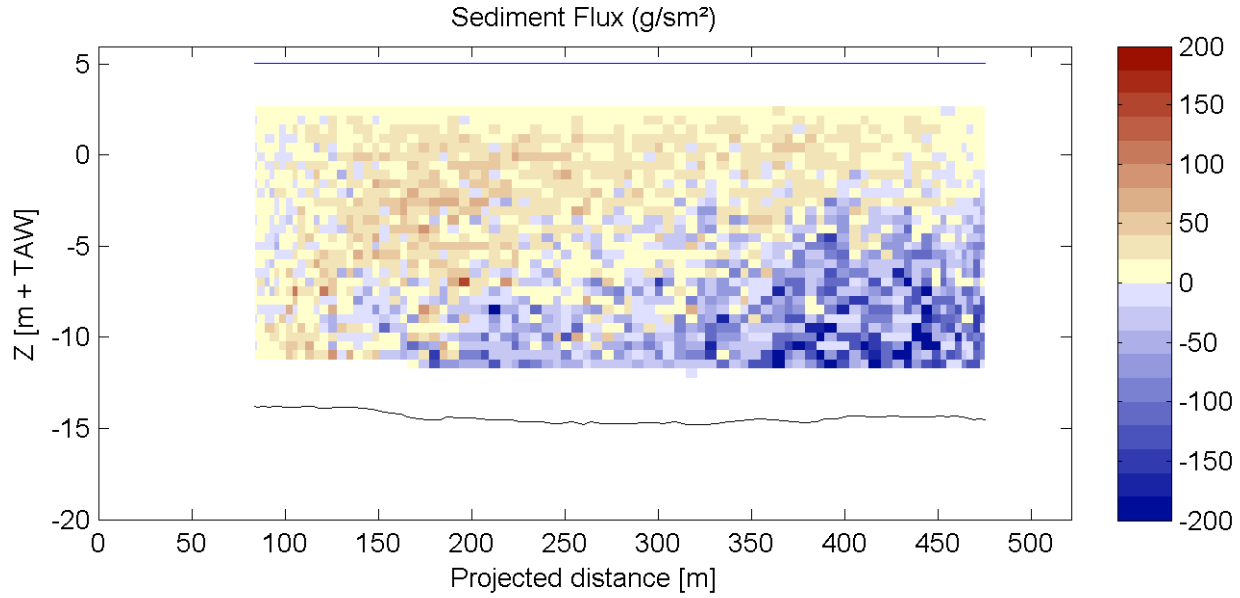
In association with : w.l | delft hydraulics, GEMS International

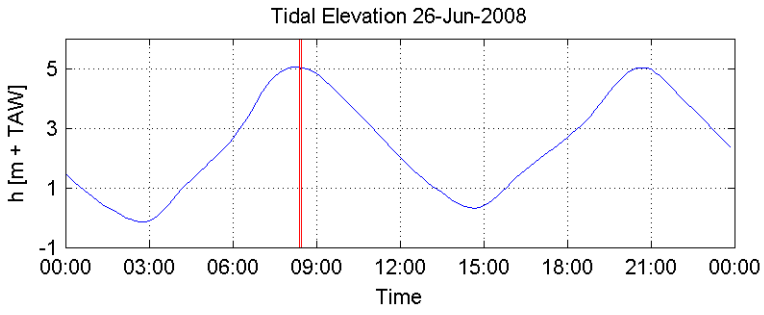
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6027DGDtlr_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

08:24 - 08:27

Time after HW [HH:MM]

0:06

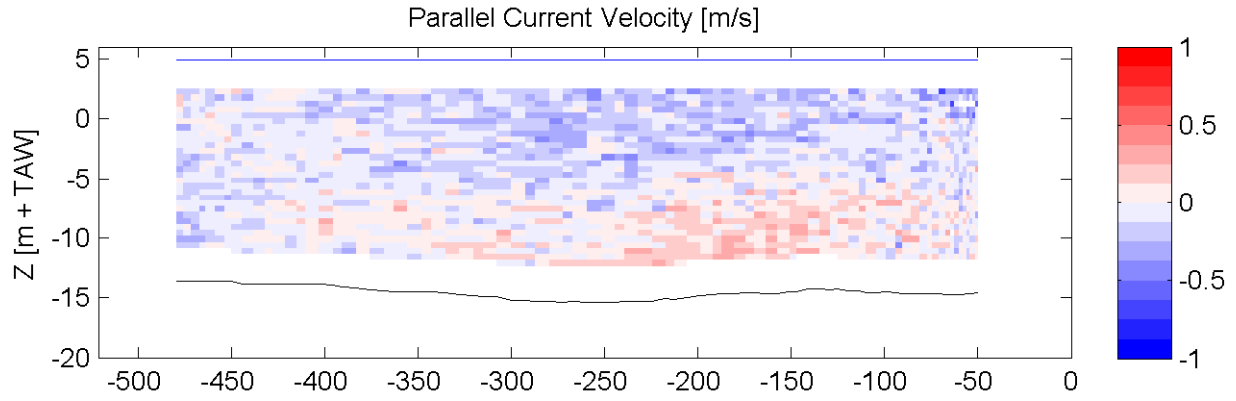
Data Processed by: IMDC

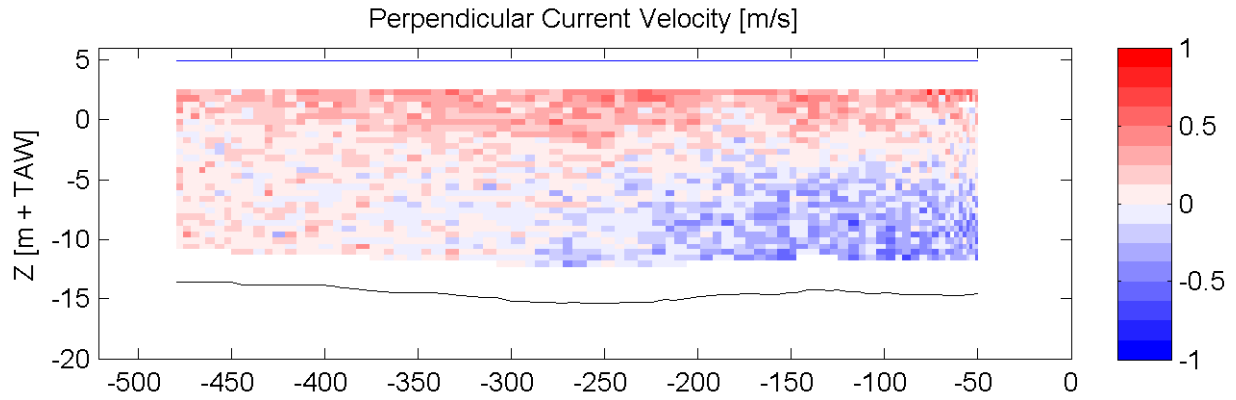
In association with : WL | delft hydraulics, GEMS International

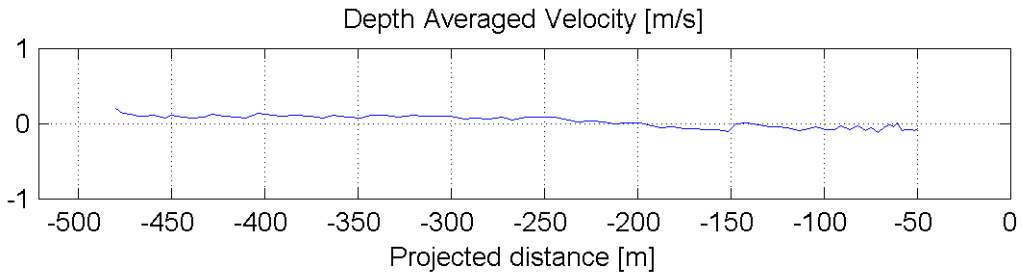
I/RA/11283/08.082/MSA

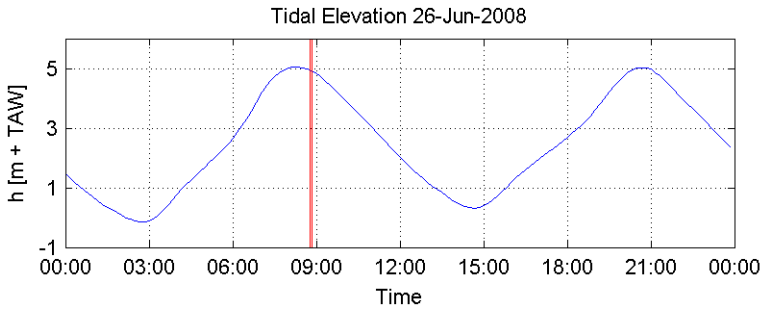
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6029DGDtrl_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

08:47 - 08:51

Time after HW [HH:MM]

0:29

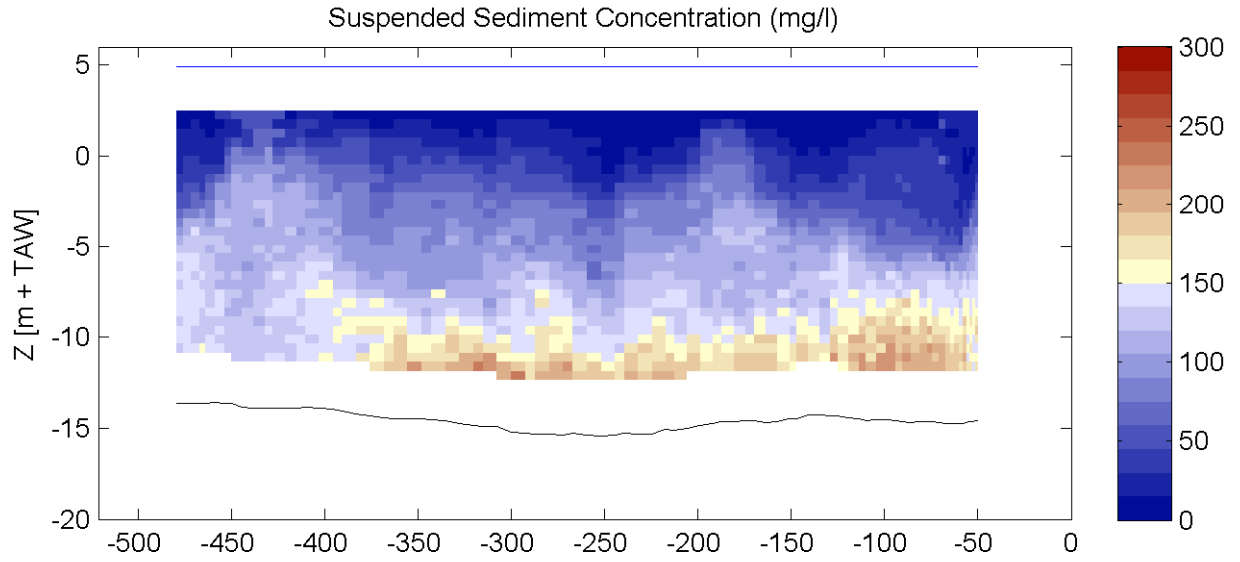
Data Processed by: IMDC

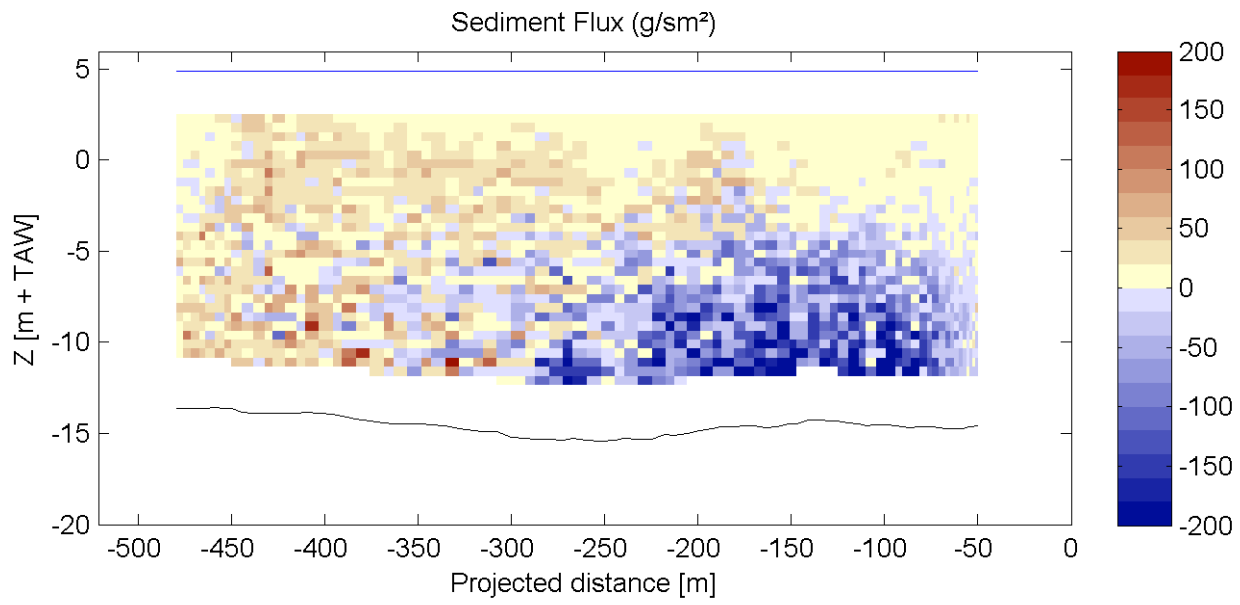
In association with : w.l | delft hydraulics, GEMS International

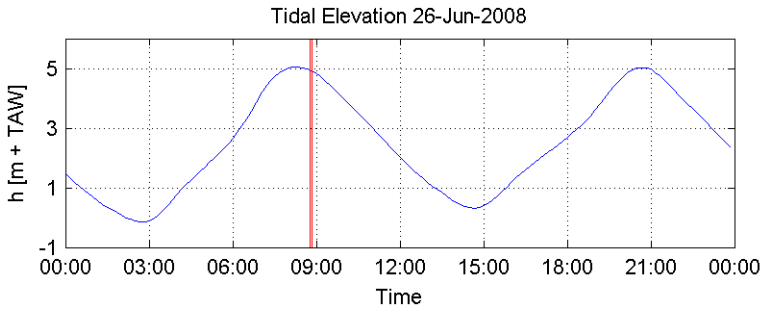
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6029DGDtrl_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

08:47 - 08:51

Time after HW [HH:MM]

0:29

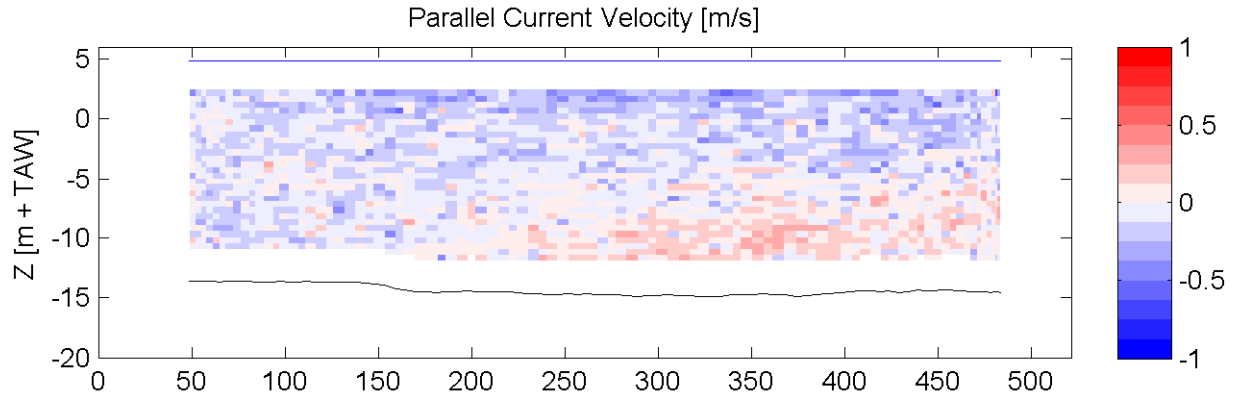
Data Processed by: IMDC

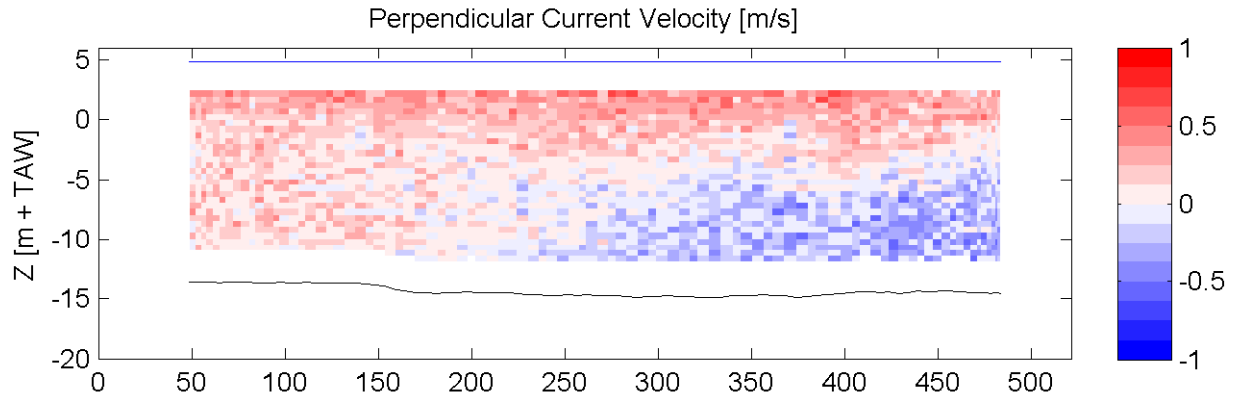
In association with : WL | delft hydraulics, GEMS International

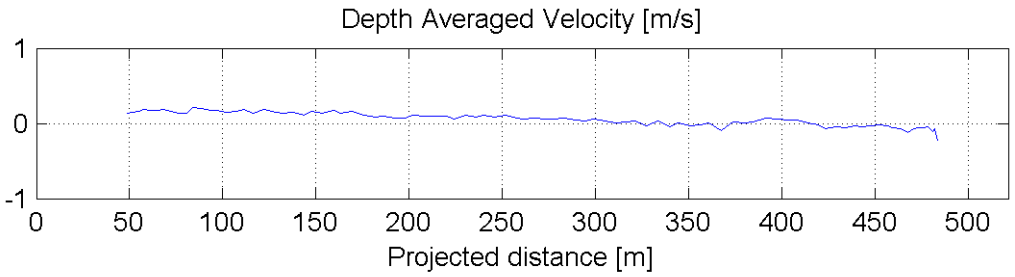
I/RA/11283/08.082/MSA

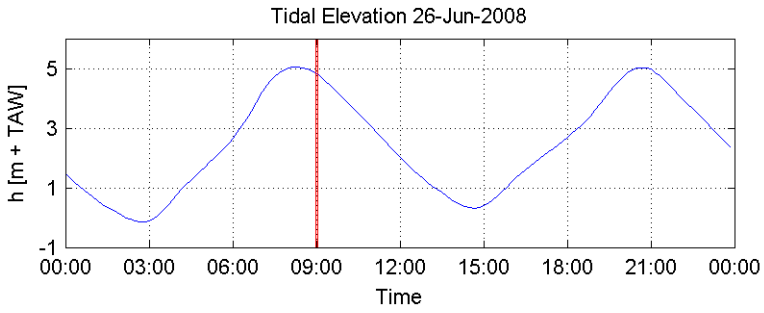
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6031DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

08:58 - 09:02

Time after HW [HH:MM]

0:40

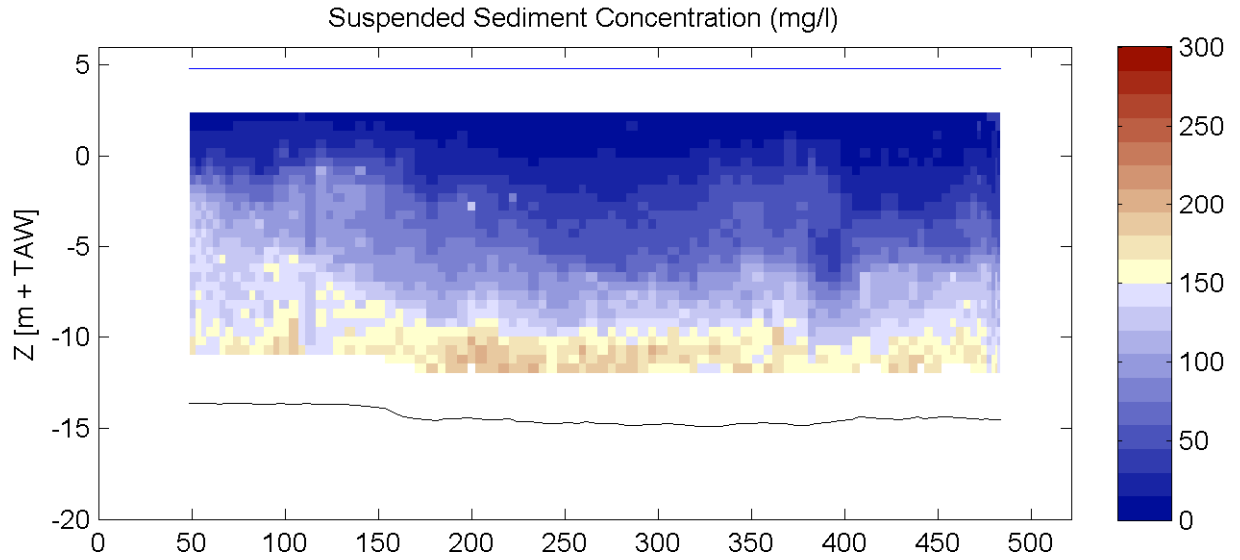
Data Processed by: IMDC

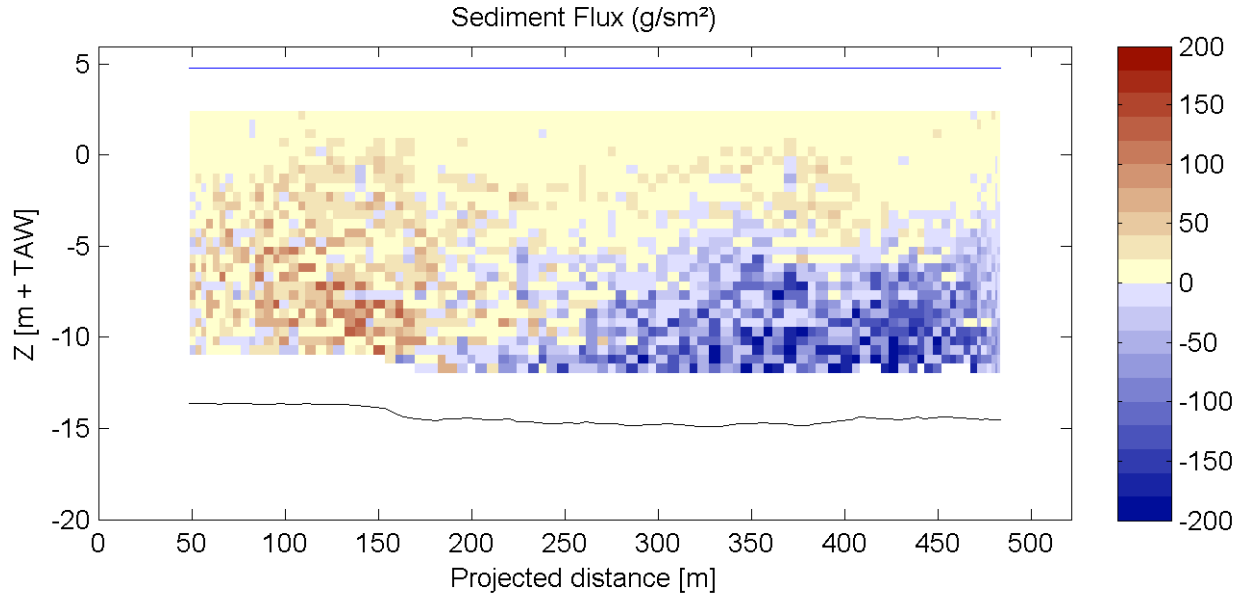
In association with : w.l | delft hydraulics, GEMS

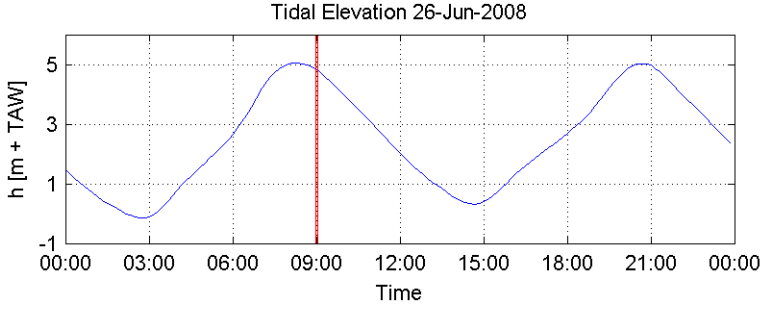
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6031DGDtlr_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

08:58 - 09:02

Time after HW [HH:MM]

0:40

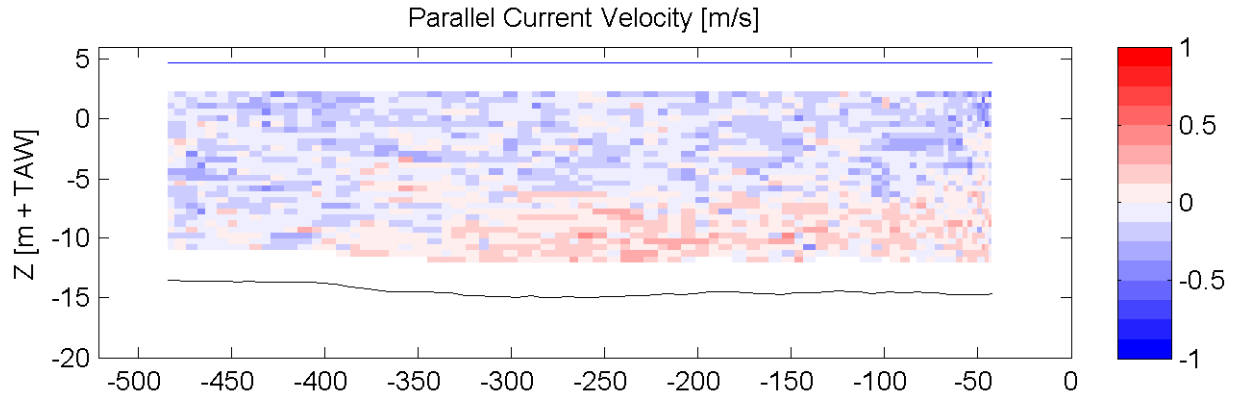
Data Processed by: IMDC

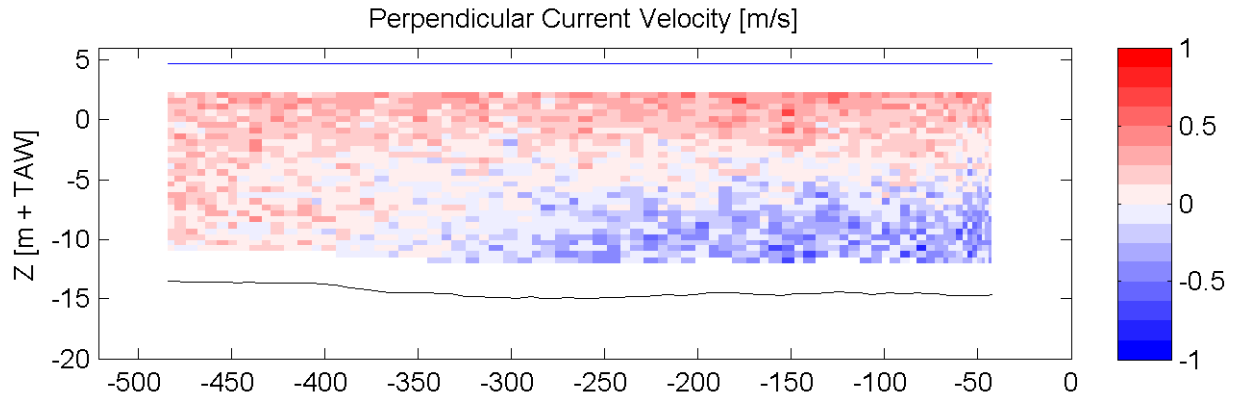
In association with : w.l | delft hydraulics GEMS

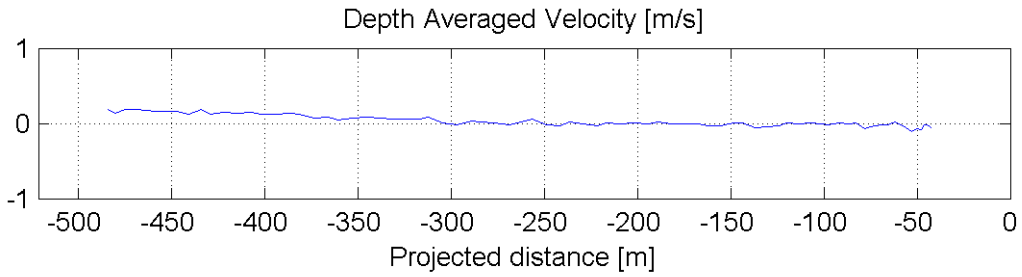
I/RA/11283/08.082/MSA

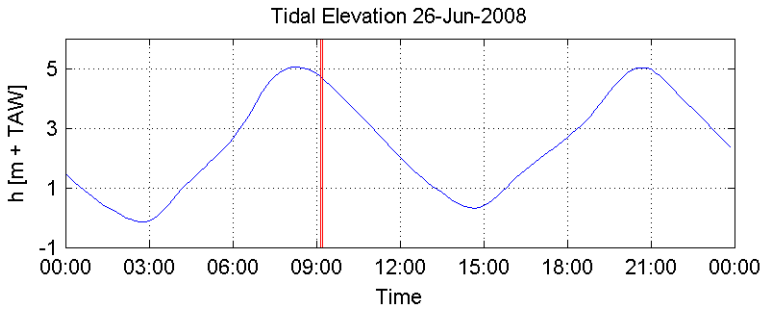
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6033DGDtrl.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

09:09 - 09:12

Time after HW [HH:MM]

0:51

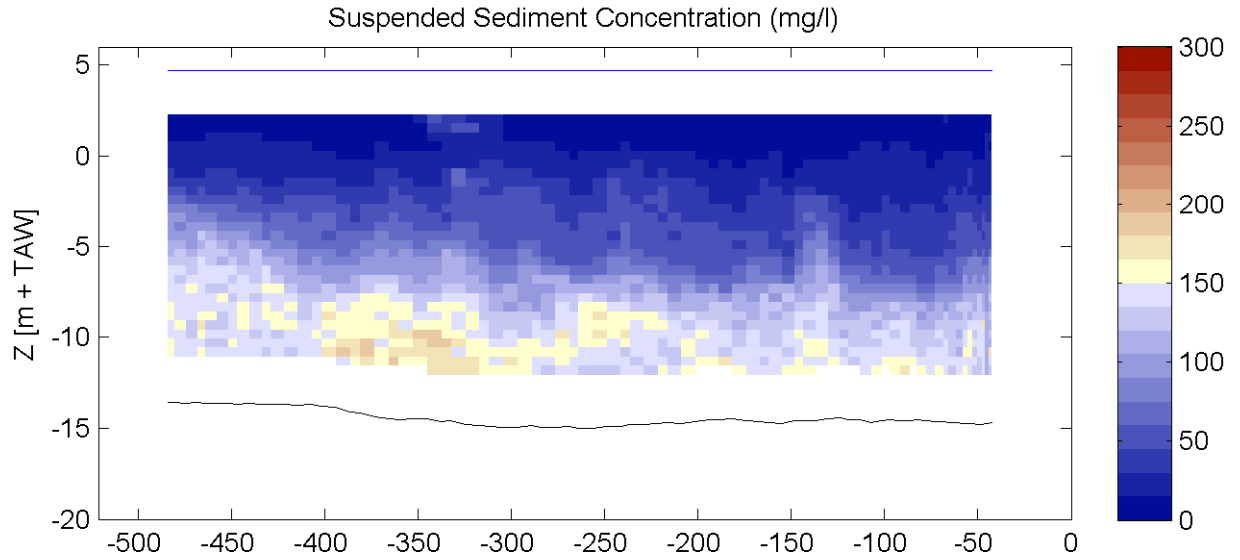
Data Processed by: IMDC

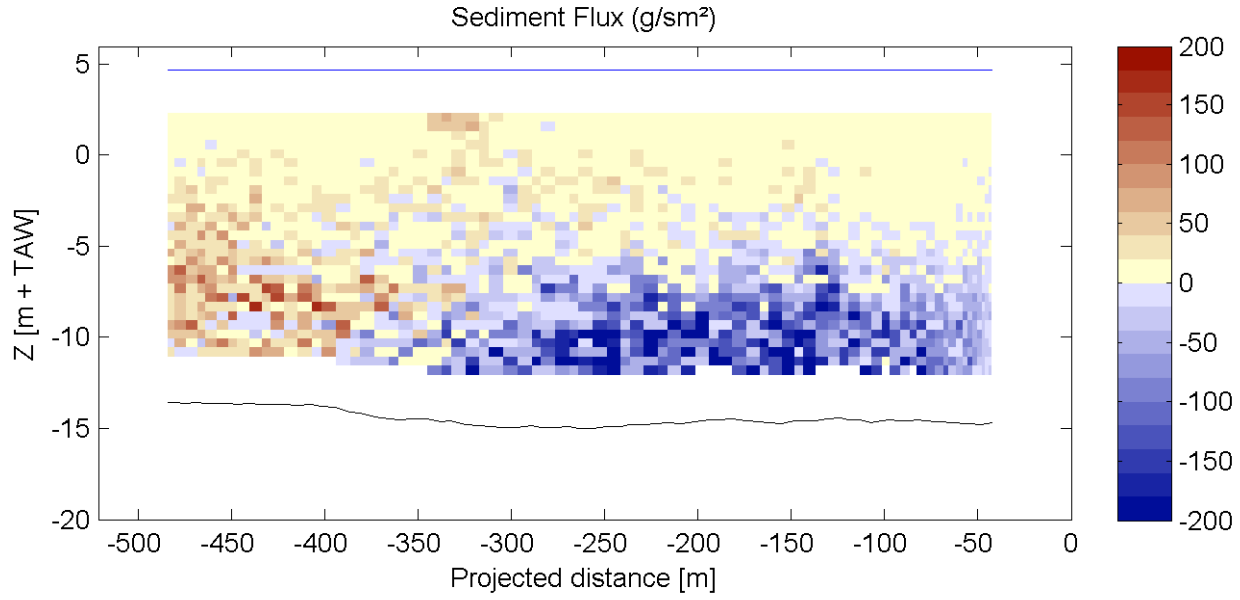
In association with : w.l | delft hydraulics, GEMS International

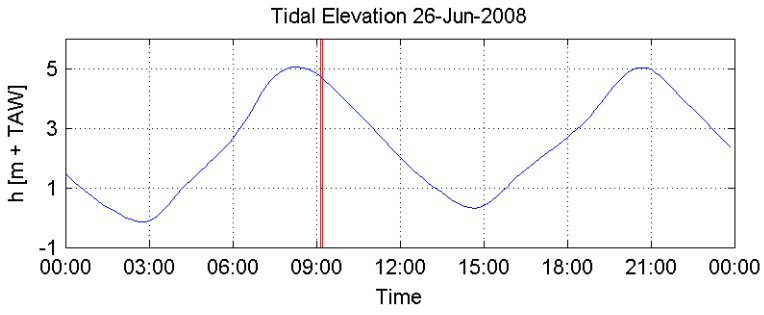
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6033DGDtrl.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

09:09 - 09:12

Time after HW [HH:MM]

0:51

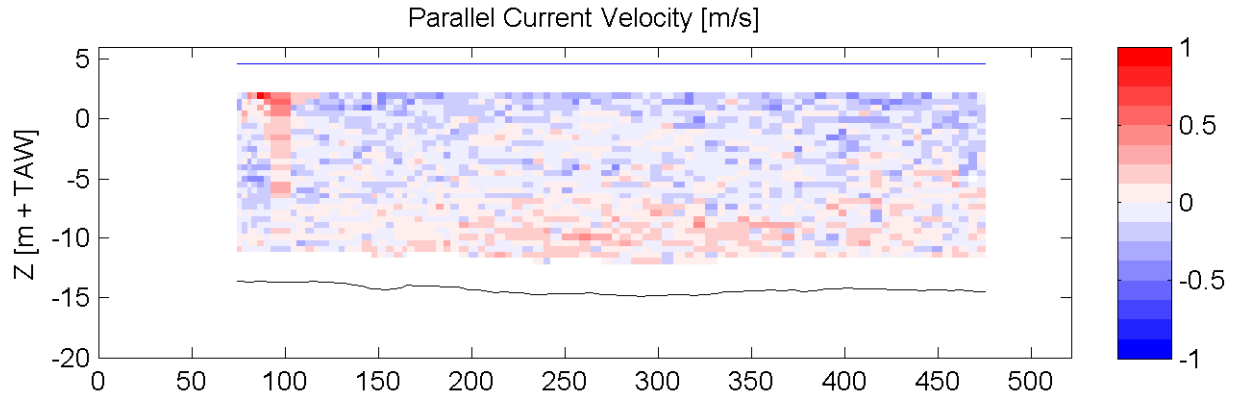
Data Processed by: IMDC

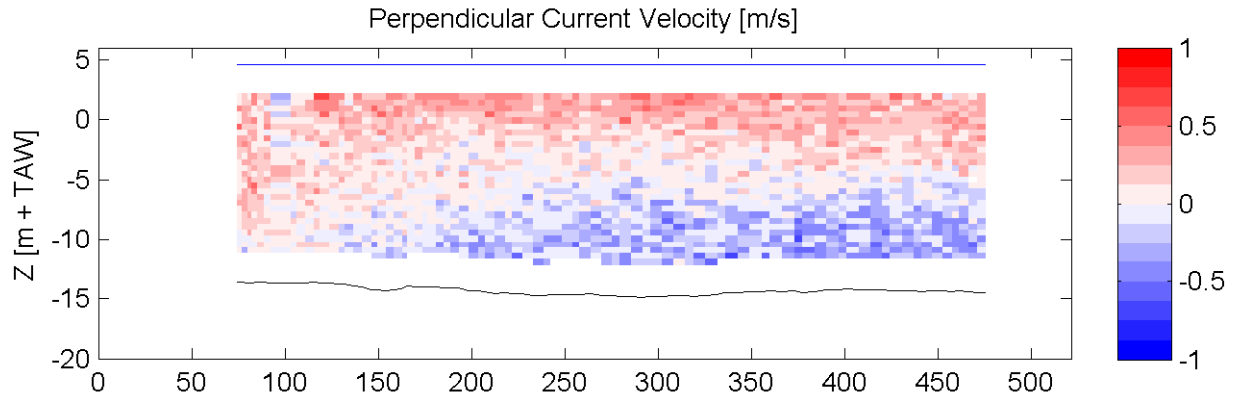
In association with : WL | delft hydraulics, GEMS International

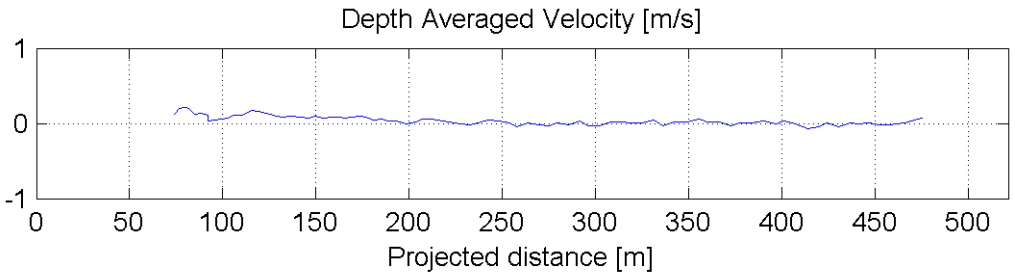
I/RA/11283/08.082/MSA

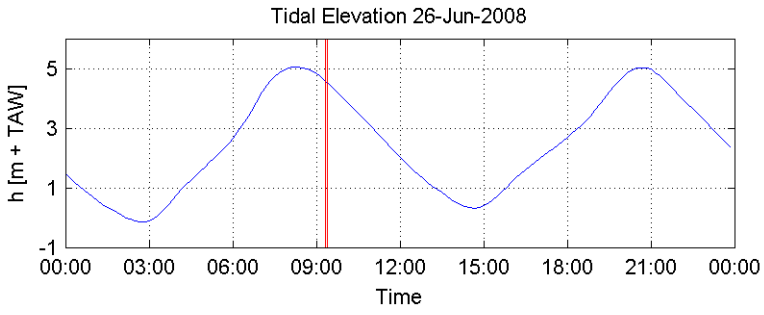
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6035DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

09:19 - 09:23

Time after HW [HH:MM]

1:01

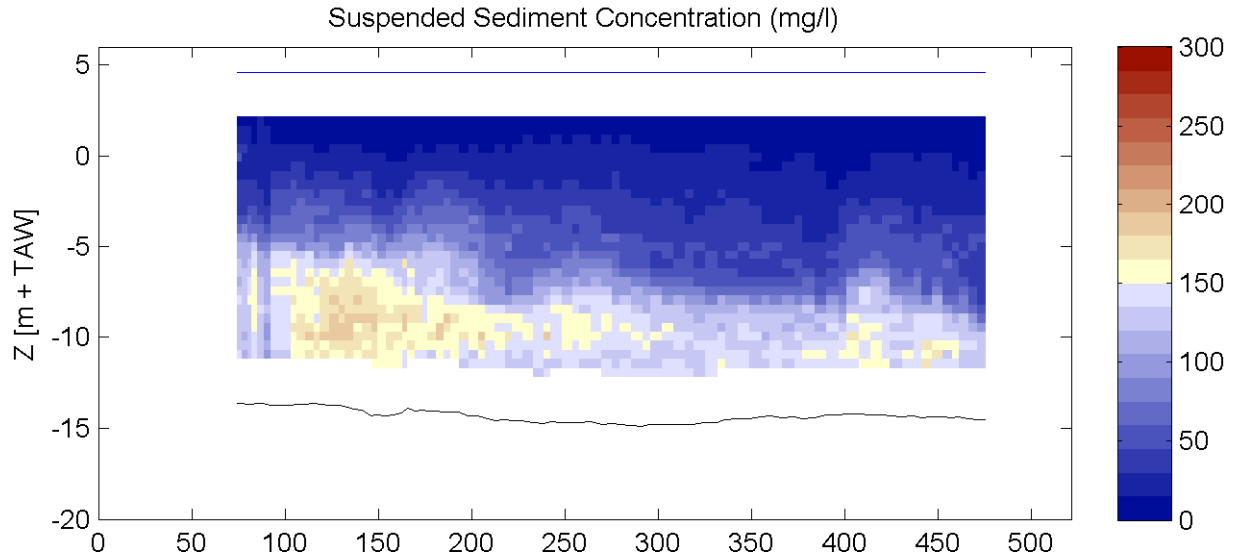
Data Processed by: IMDC

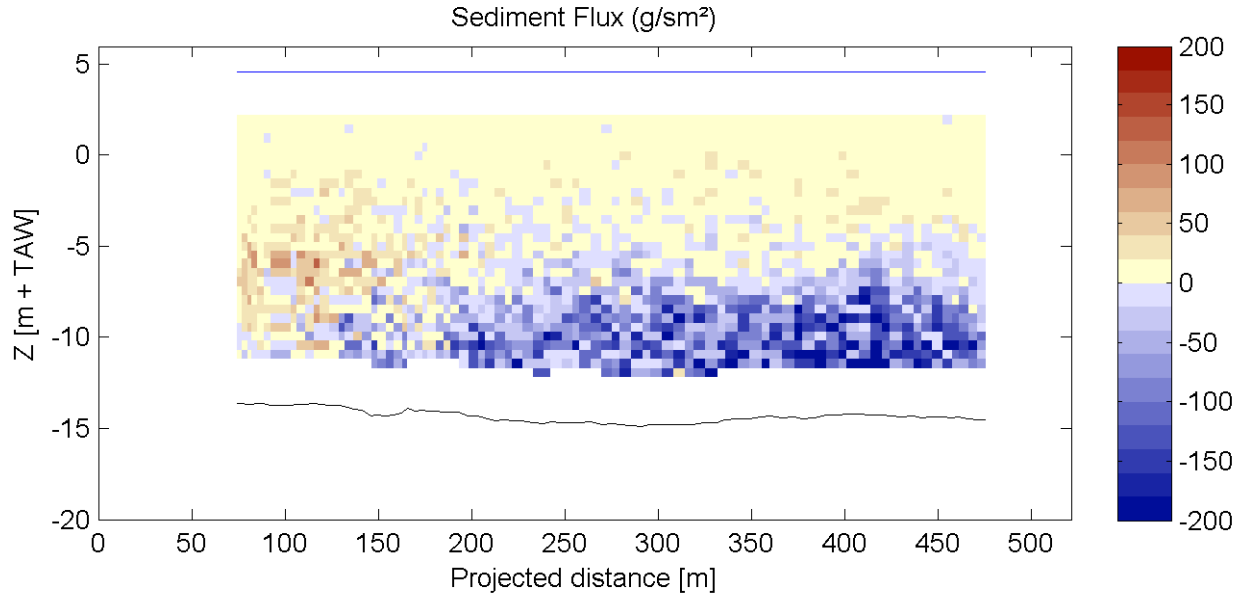
In association with : w.l | delft hydraulics, GEMS

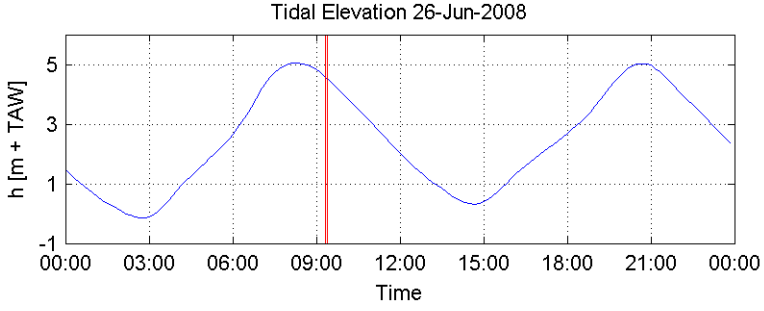
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6035DGDtlr_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

09:19 - 09:23

Time after HW [HH:MM]

1:01

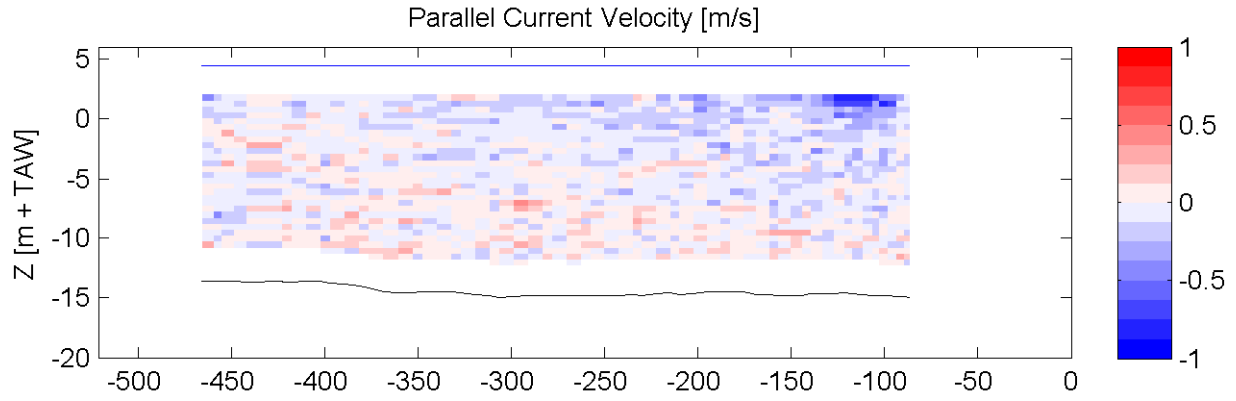
Data Processed by: IMDC

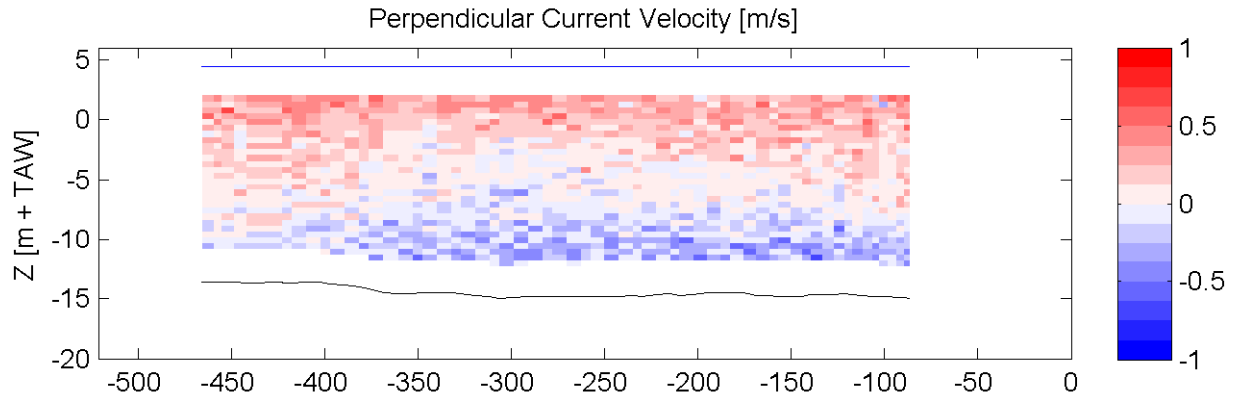
In association with : w.l | delft hydraulics GEMS

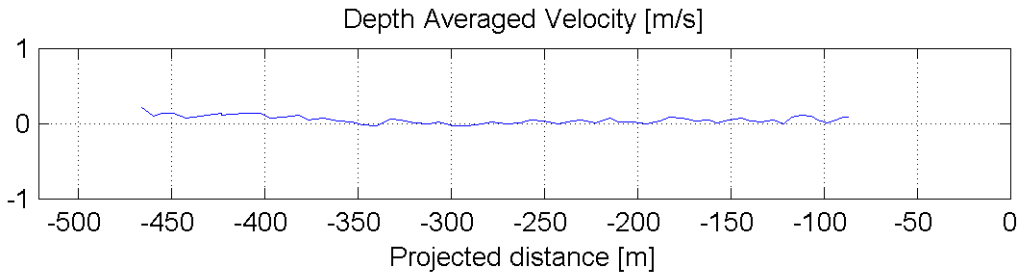
I/RA/11283/08.082/MSA

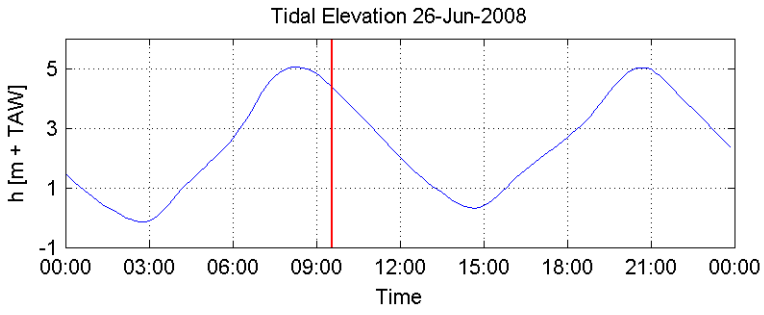
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6037DGDtrl.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

09:31 - 09:34

Time after HW [HH:MM]

1:13

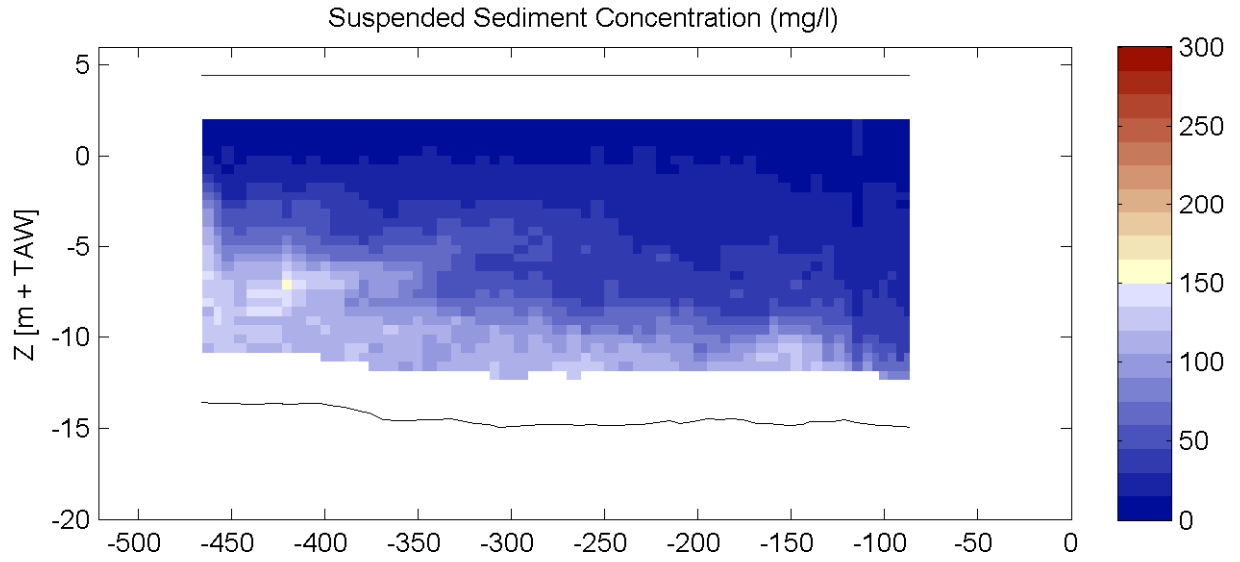
Data Processed by: IMDC

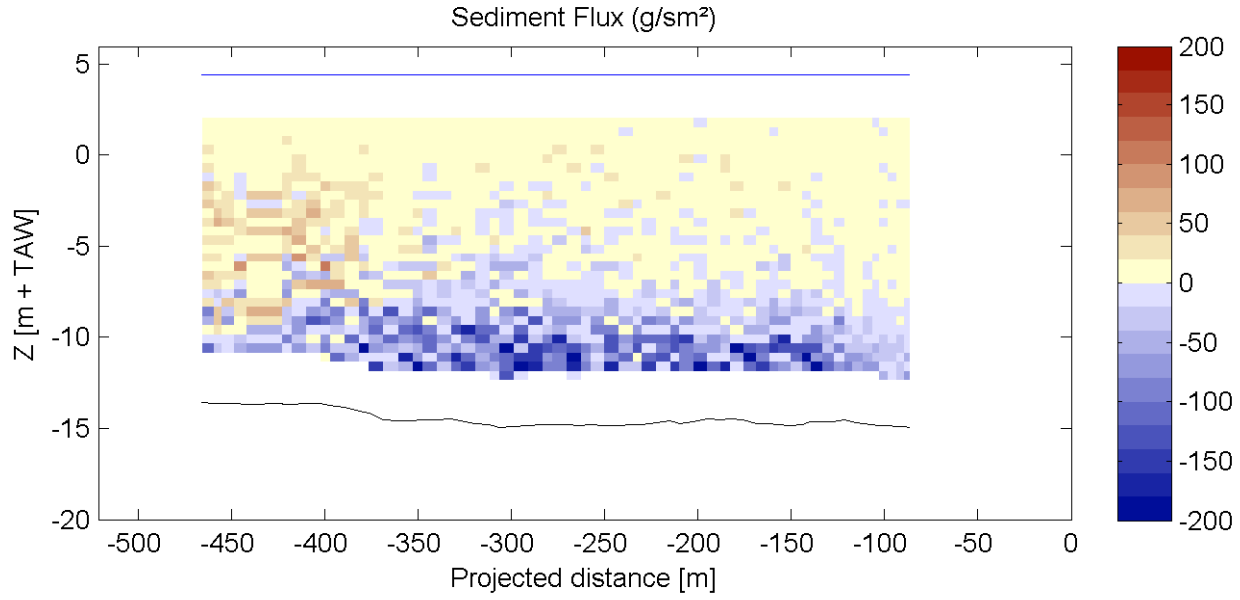
In association with : w.l | delft hydraulics, GEMS

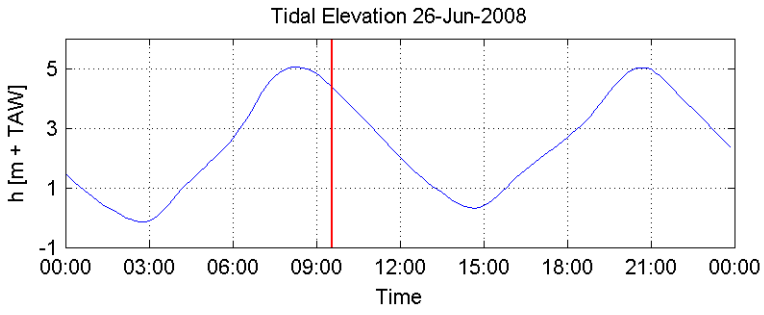
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6037DGDtrl.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

09:31 - 09:34

Time after HW [HH:MM]

1:13

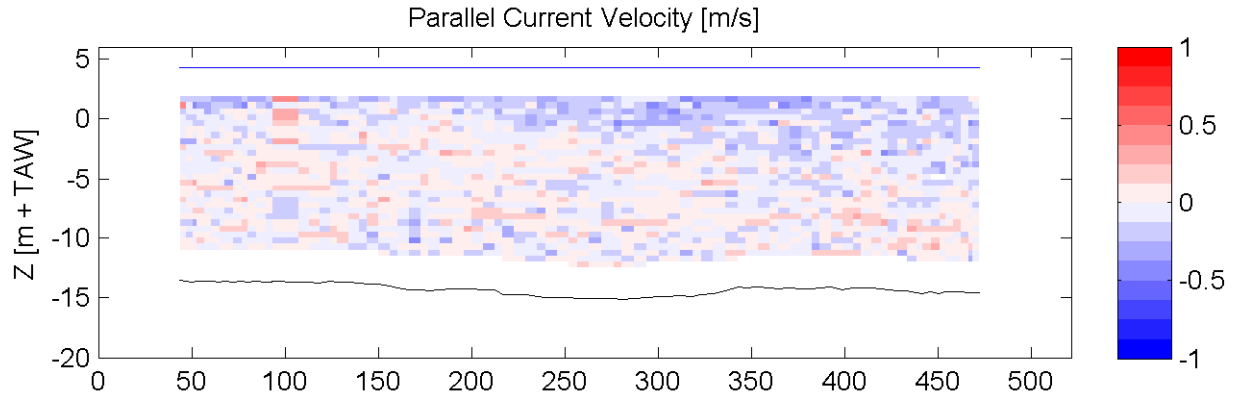
Data Processed by: IMDC

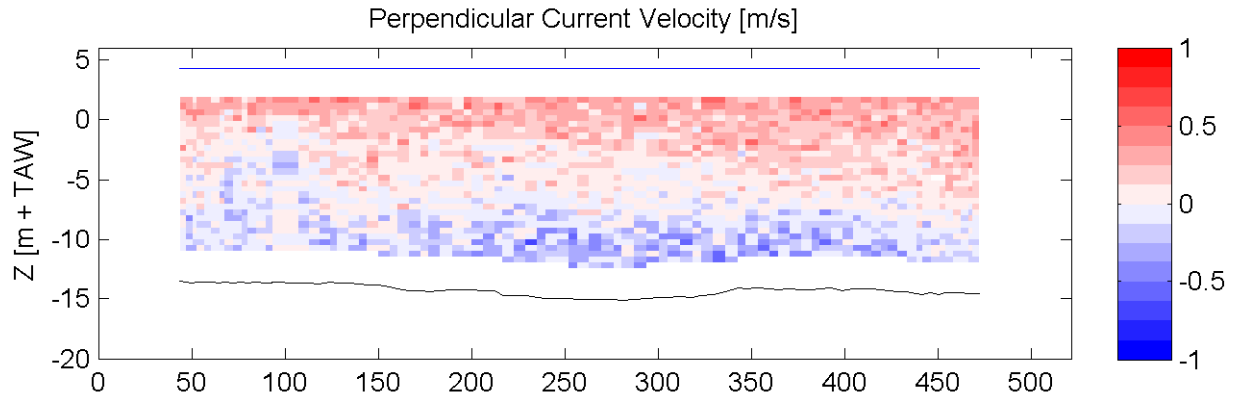
In association with : WL | delft hydraulics, GEMS International

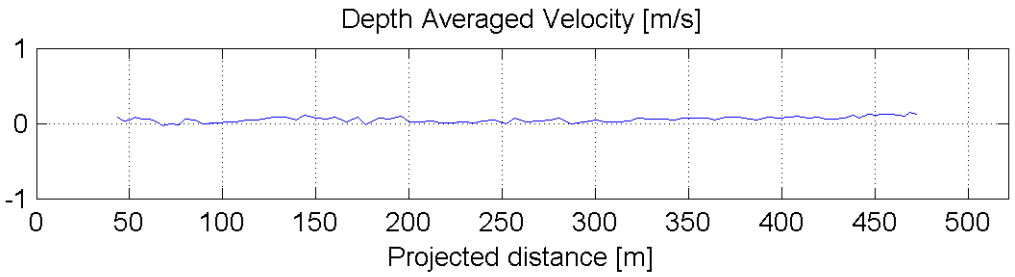
I/RA/11283/08.082/MSA

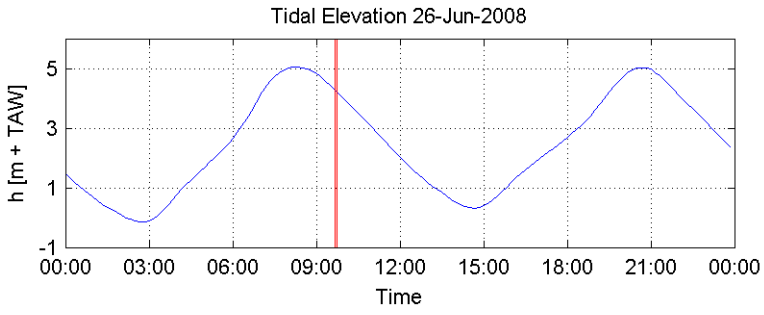
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6039DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

09:41 - 09:44

Time after HW [HH:MM]

1:23

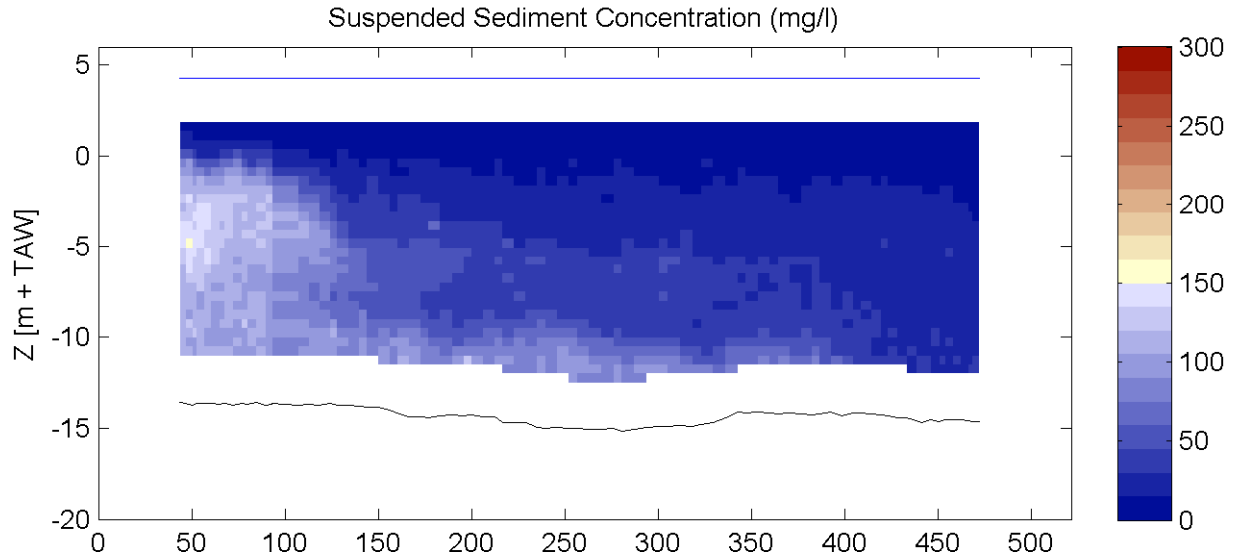
Data Processed by: IMDC

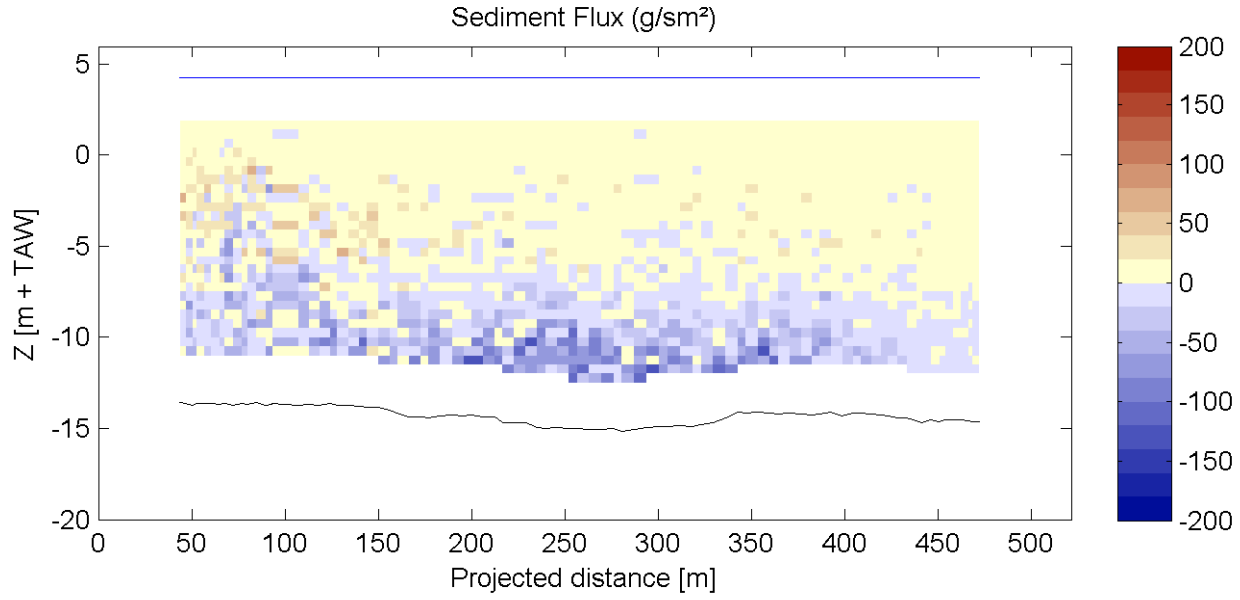
In association with : w.l | delft hydraulics, GEMS

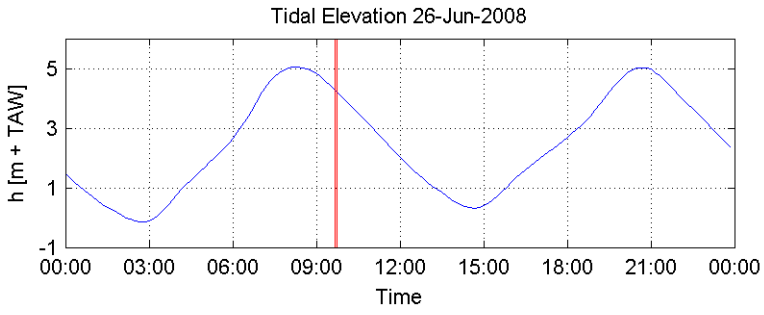
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6039DGDtlr_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

09:41 - 09:44

Time after HW [HH:MM]

1:23

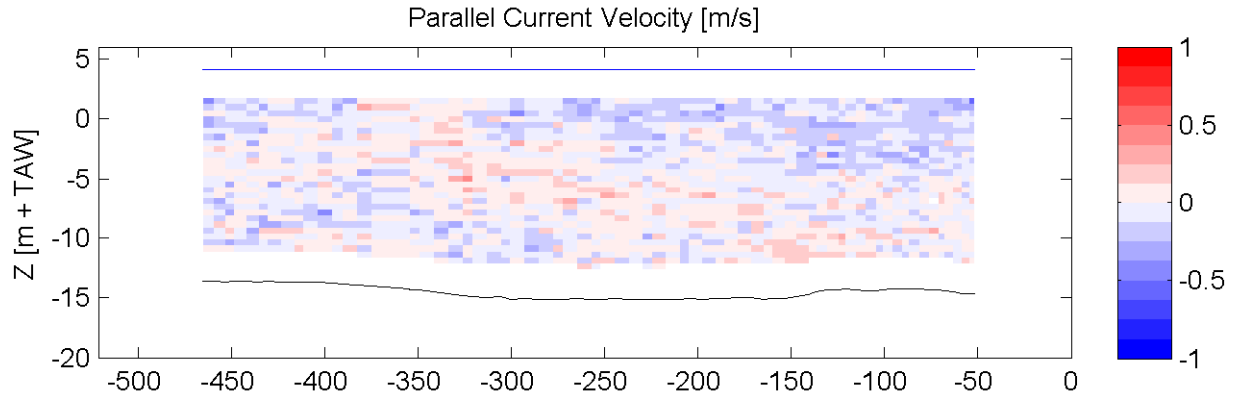
Data Processed by: IMDC

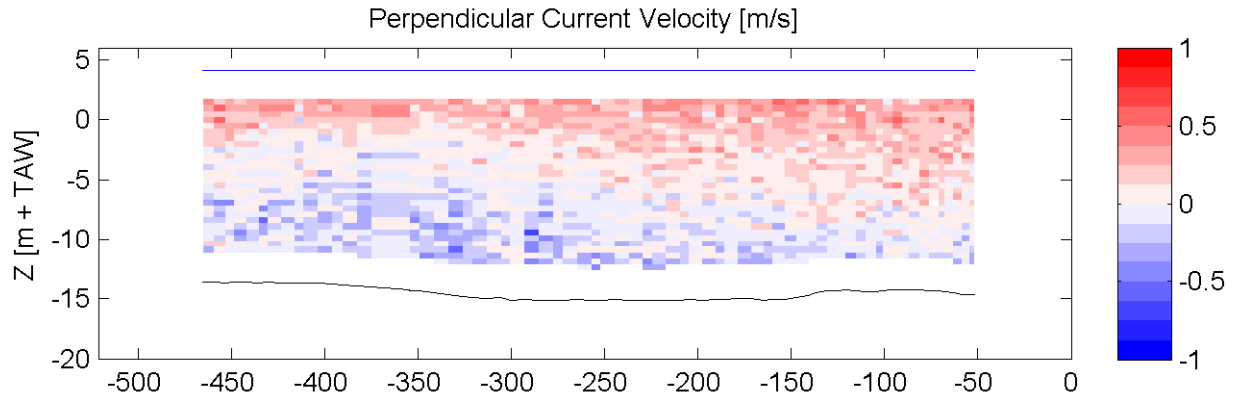
In association with : WL | delft hydraulics, GEMS International

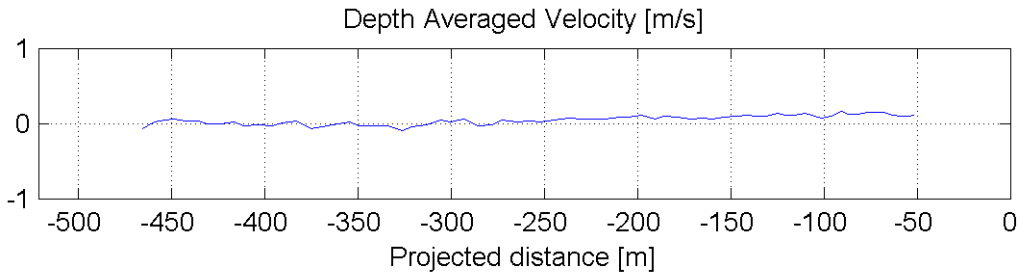
I/RA/11283/08.082/MSA

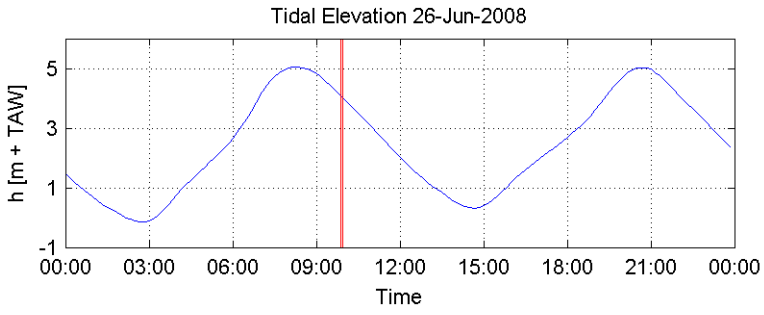
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6041DGDtrl.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

09:53 - 09:56

Time after HW [HH:MM]

1:34

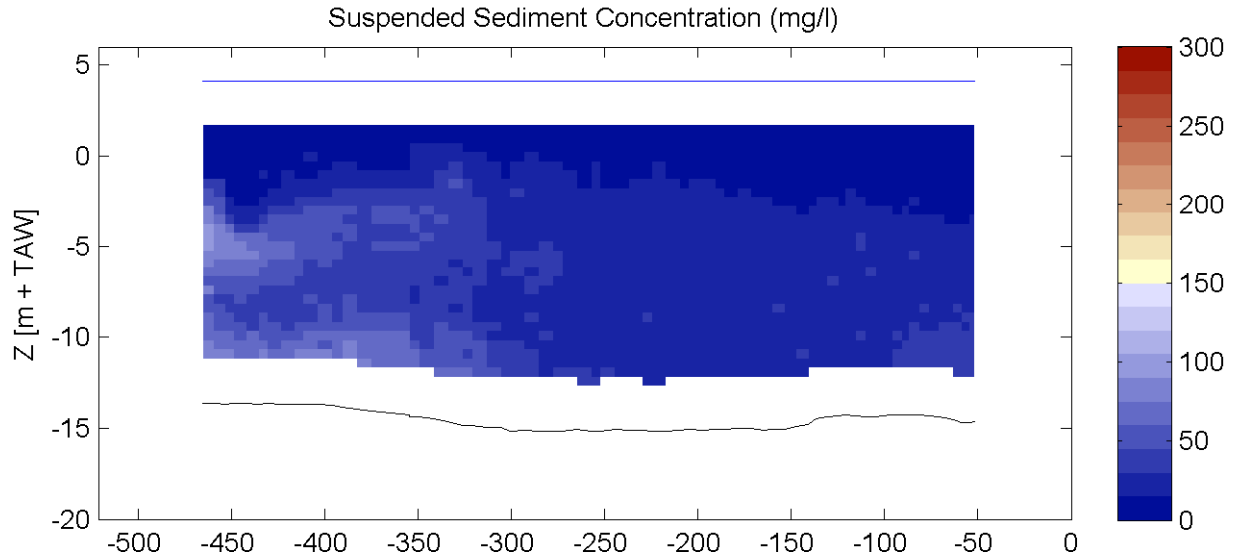
Data Processed by: IMDC

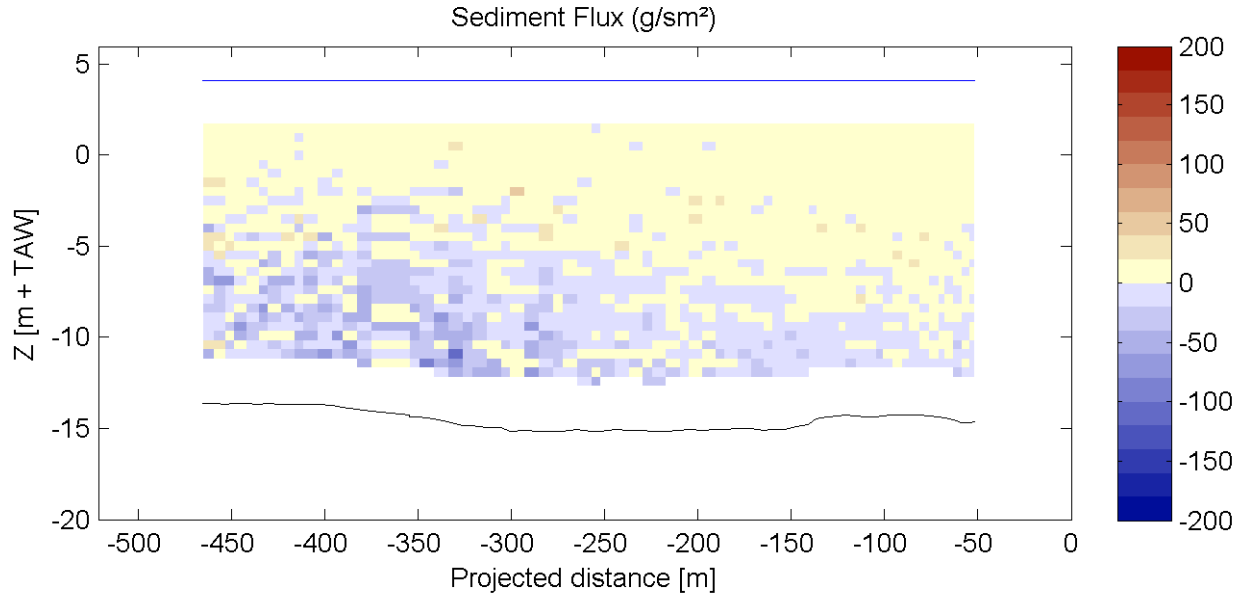
In association with : w.l | delft hydraulics, GEMS International

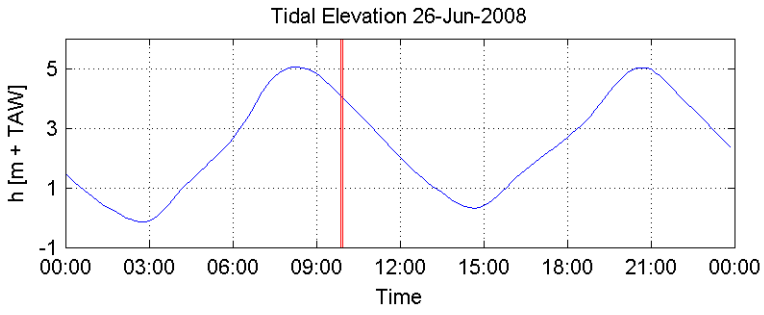
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6041DGDtrl.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

09:53 - 09:56

Time after HW [HH:MM]

1:34

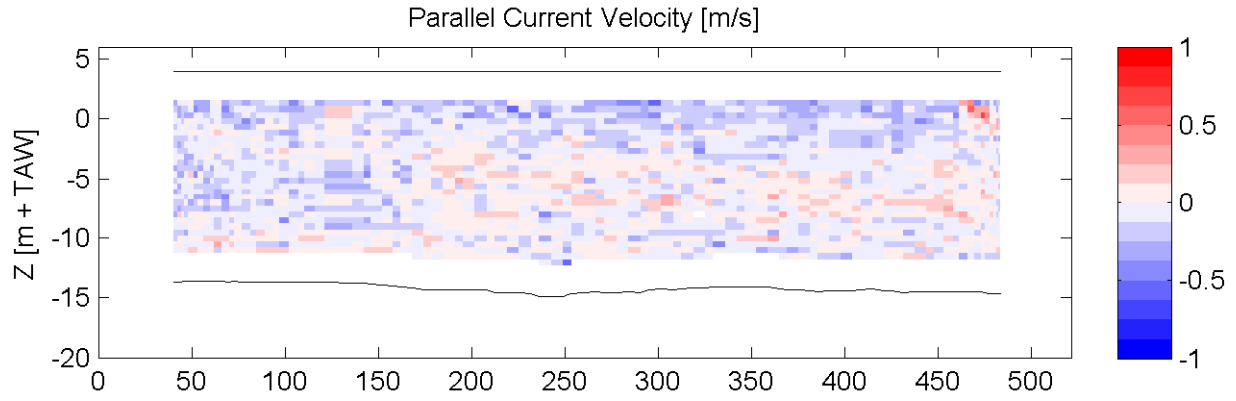
Data Processed by: IMDC

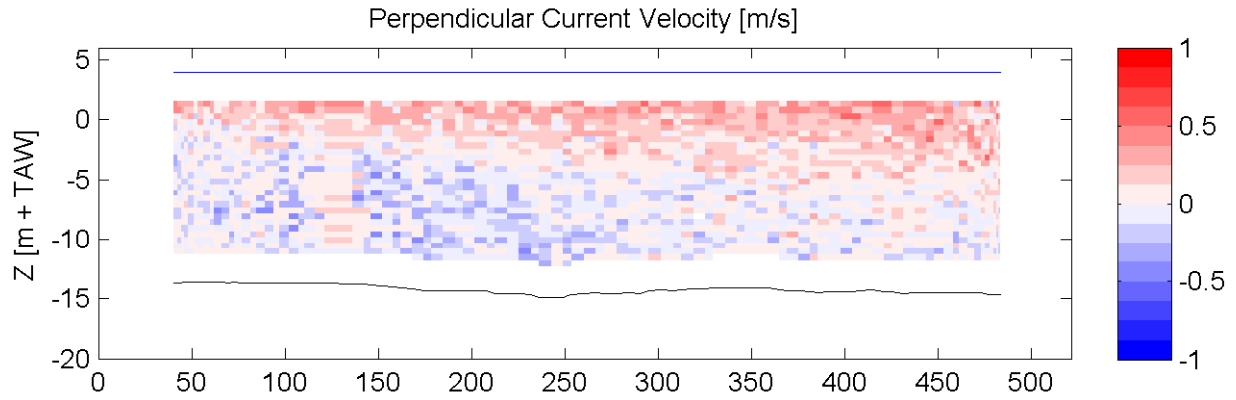
In association with : WL | delft hydraulics, GEMS International

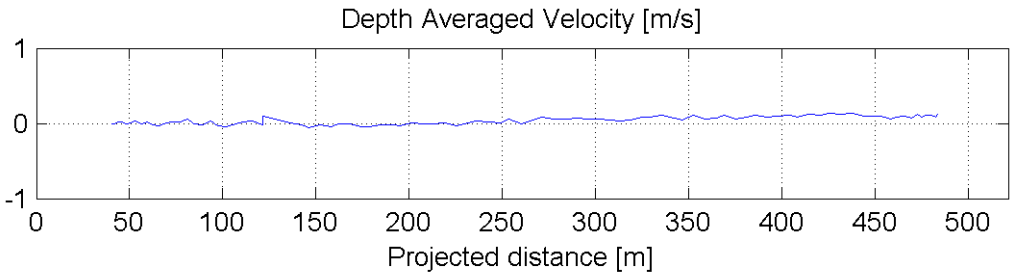
I/RA/11283/08.082/MSA

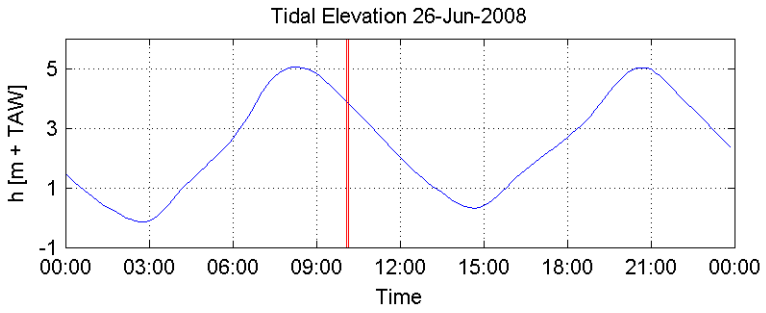
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6043DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

10:04 - 10:09

Time after HW [HH:MM]

1:46

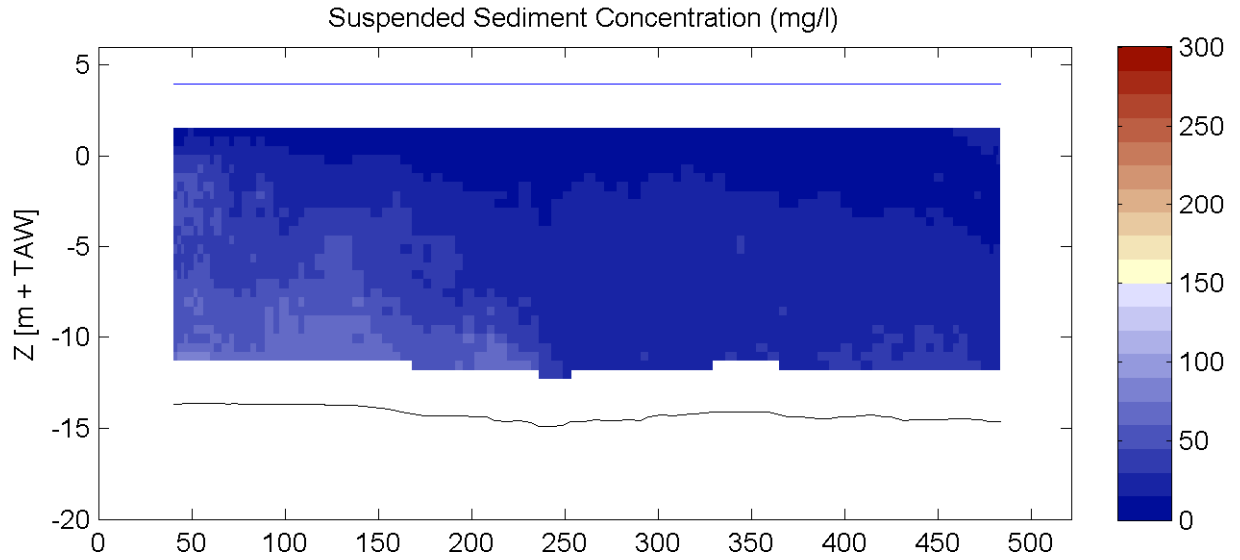
Data Processed by: IMDC

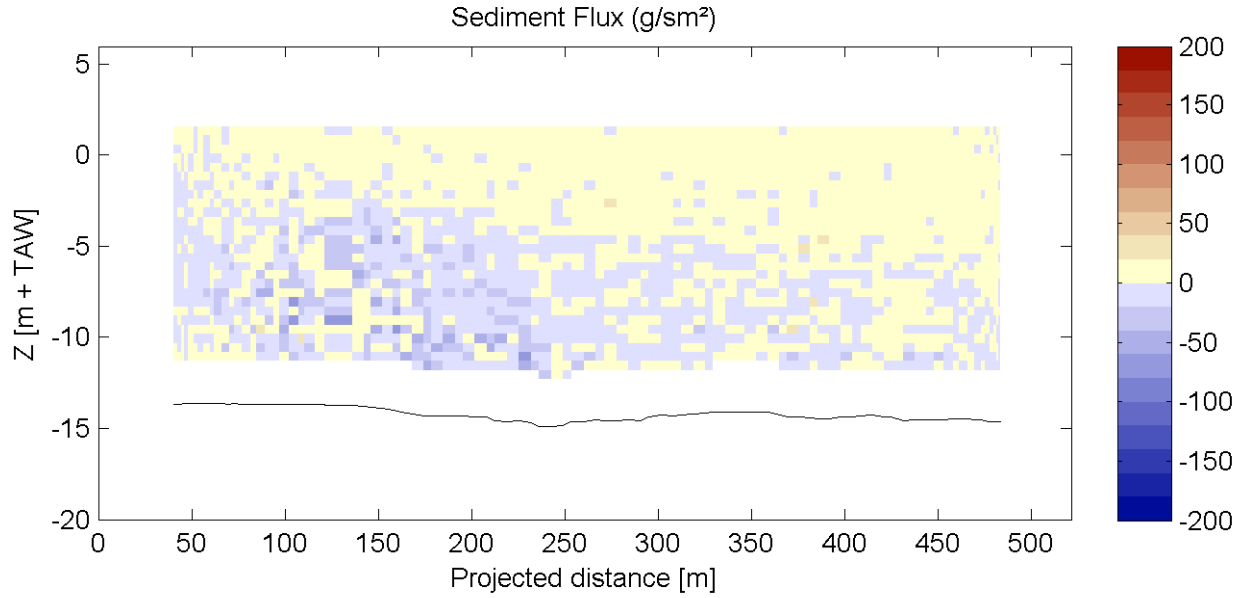
In association with : WL | delft hydraulics, GEMS International

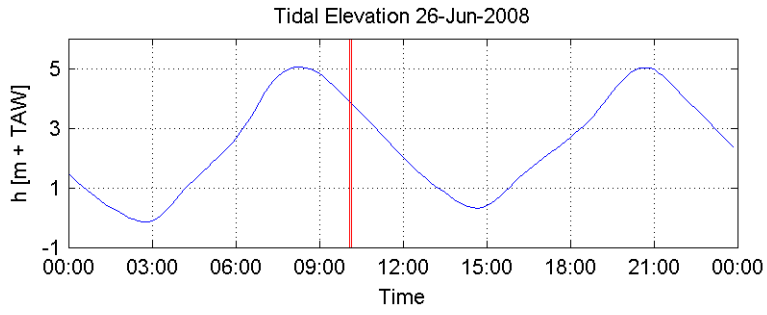
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6043DGDtlr_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

10:04 - 10:09

Time after HW [HH:MM]

1:46

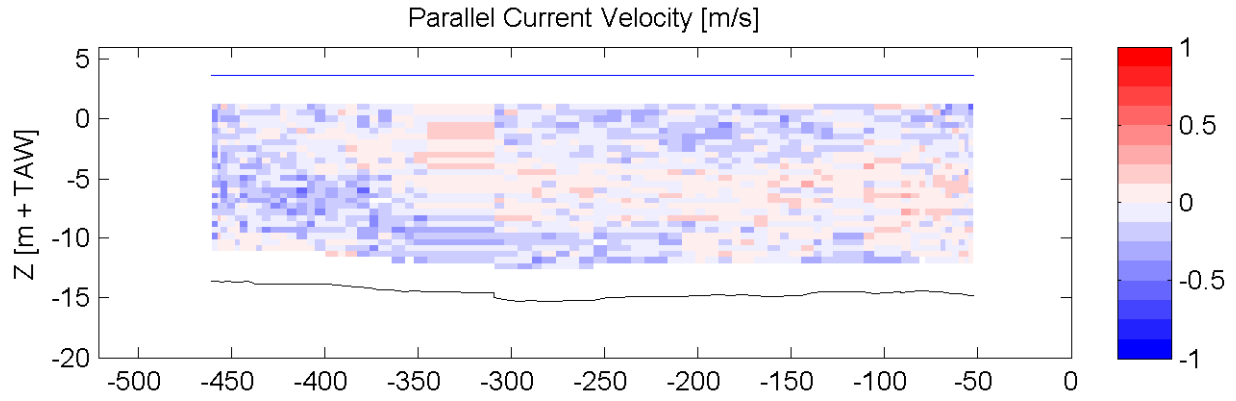
Data Processed by: IMDC

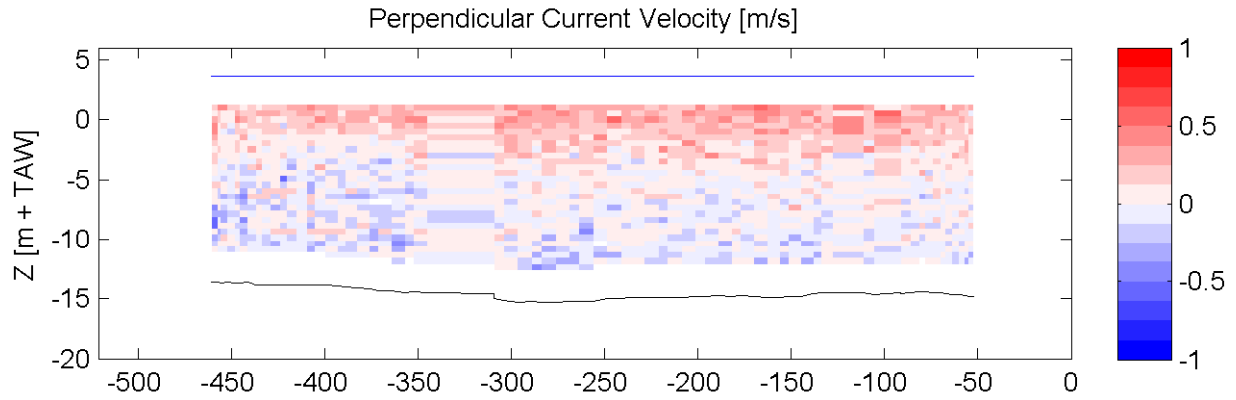
In association with : WL | delft hydraulics, GEMS International

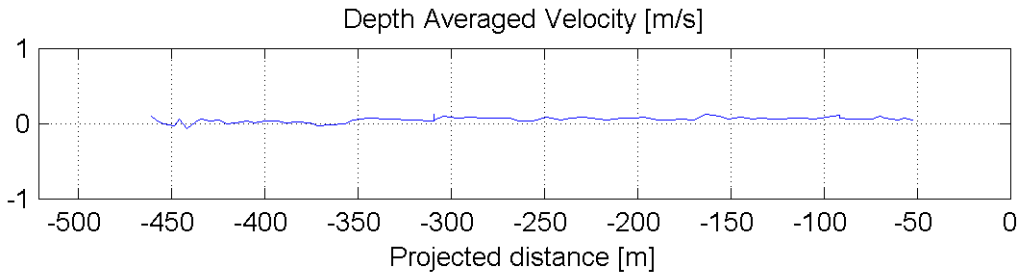
I/RA/11283/08.082/MSA

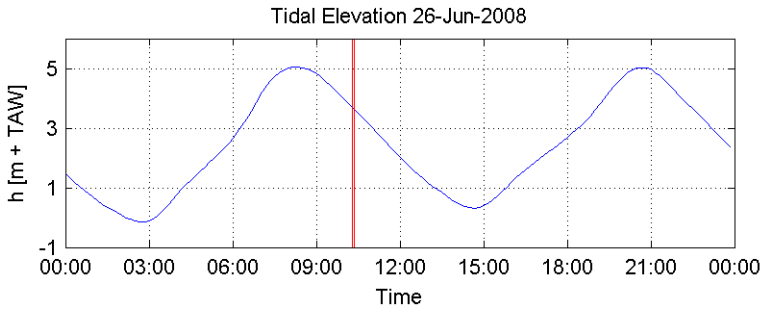
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6045DGDtrl.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

10:17 - 10:20

Time after HW [HH:MM]

1:59

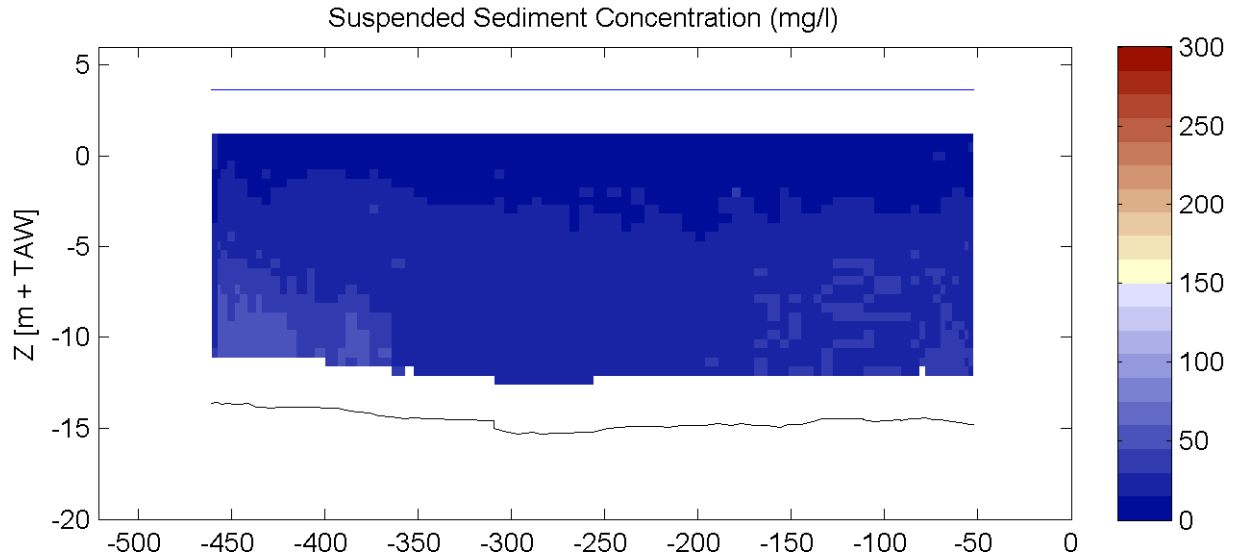
Data Processed by: IMDC

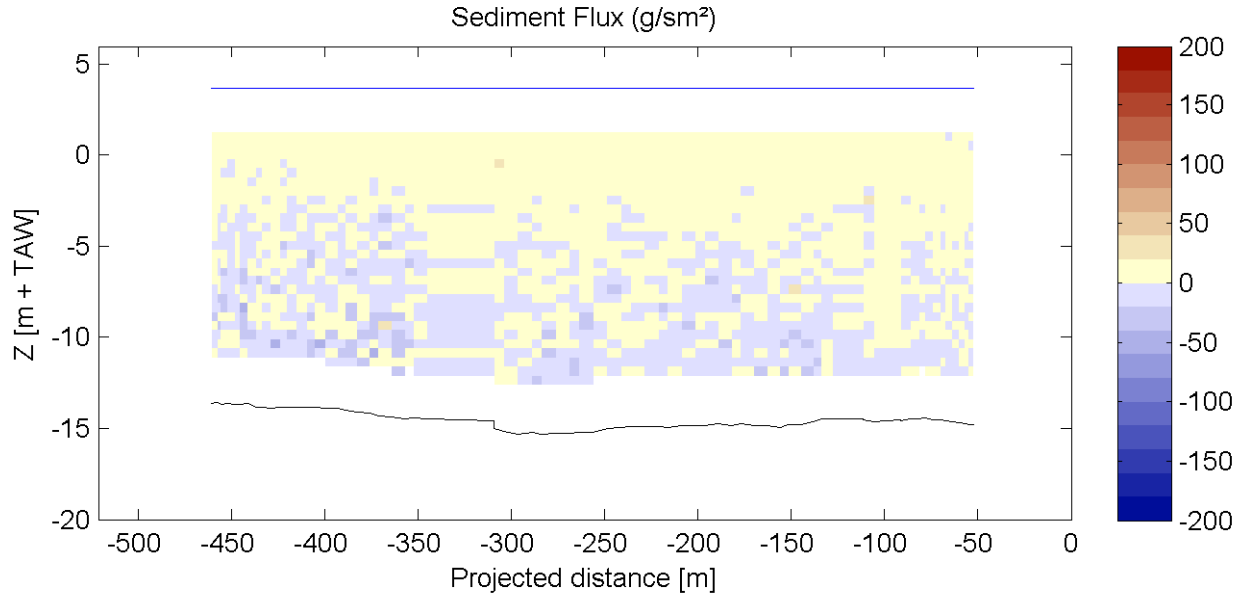
In association with : w.l | delft hydraulics GEMS

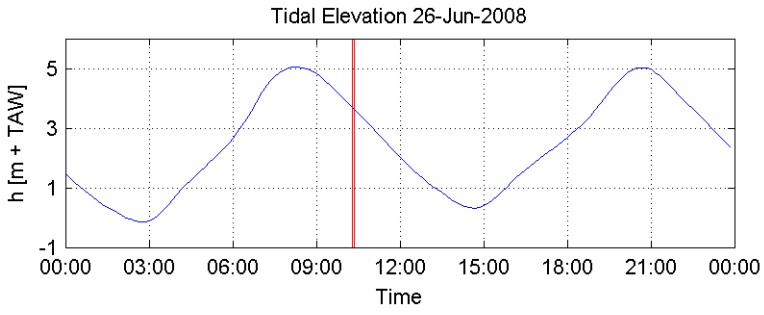
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6045DGDtrl.csv	Location: Transect DGD







HW/LW: 08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

10:17 - 10:20

Time after HW [HH:MM]

1:59

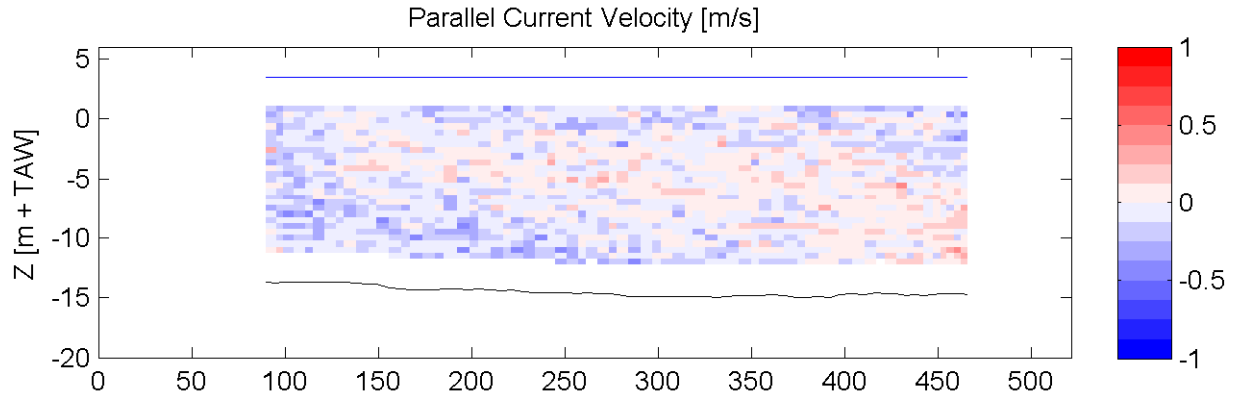
Data Processed by: IMDC

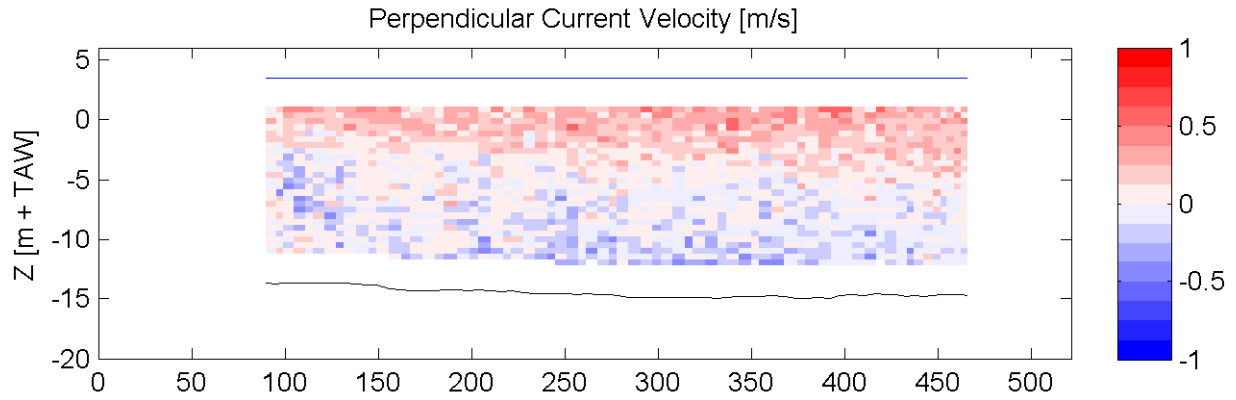
In association with : w.l | delft hydraulics GEMS

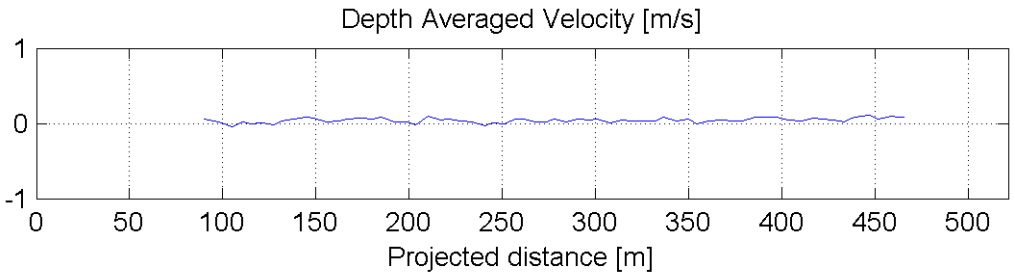
I/RA/11283/08.082/MSA

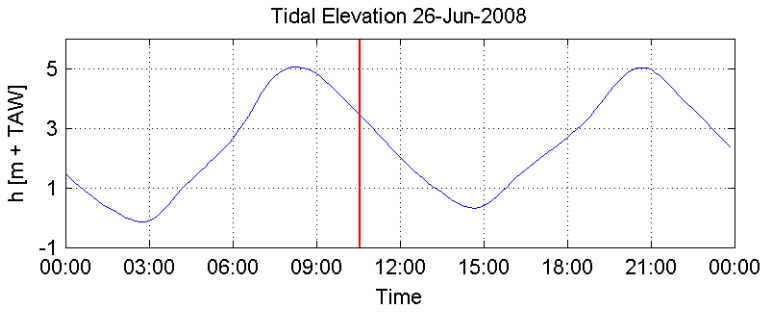
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6047DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

10:31 - 10:34

Time after HW [HH:MM]

2:12

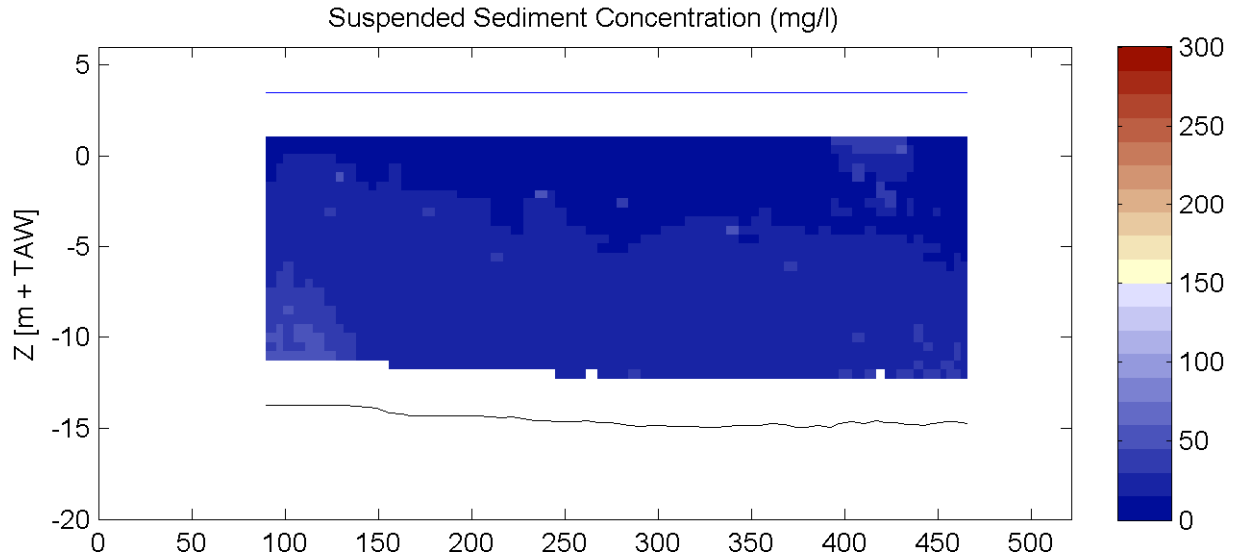
Data Processed by: IMDC

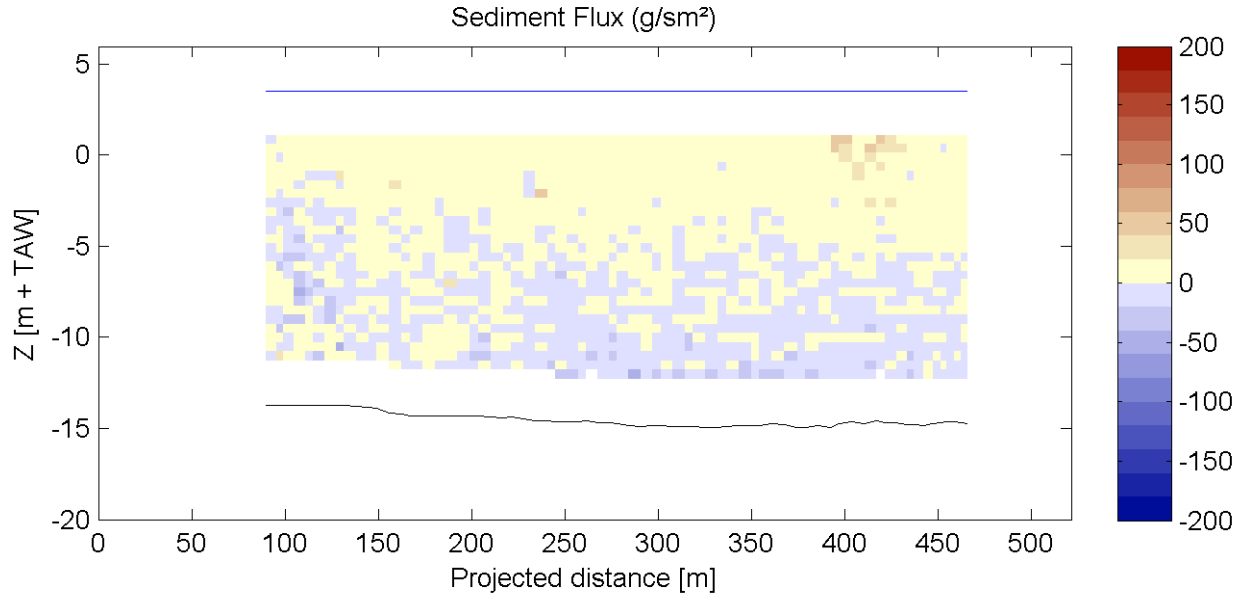
In association with : WL | delft hydraulics, GEMS International

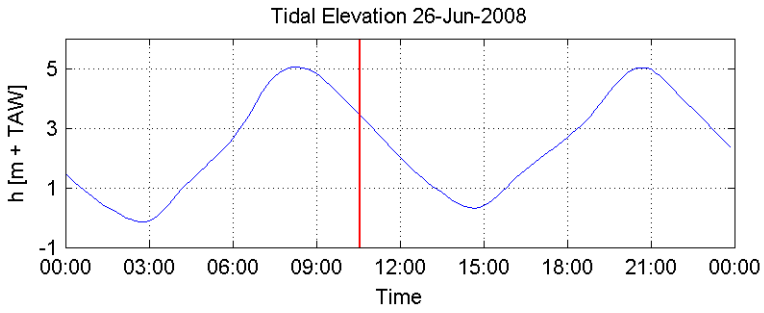
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6047DGDtlr_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

10:31 - 10:34

Time after HW [HH:MM]

2:12

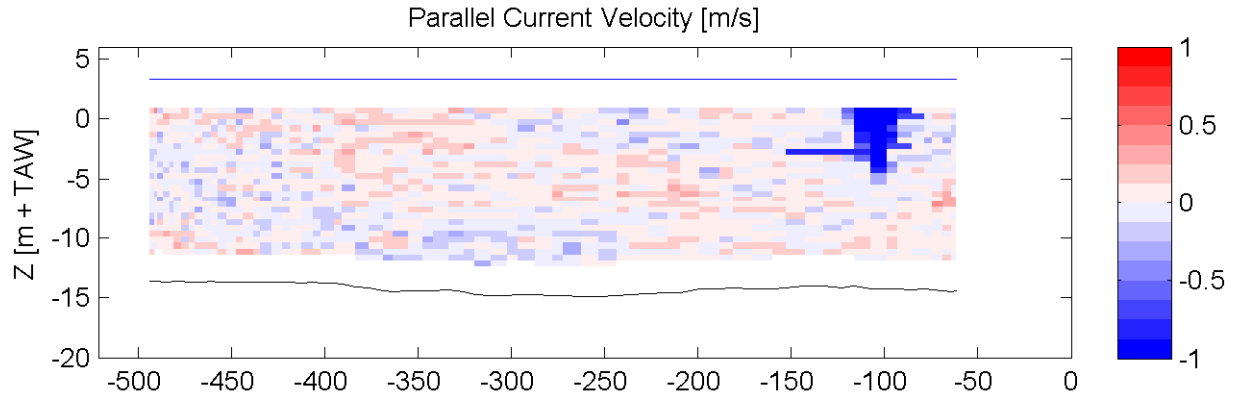
Data Processed by: IMDC

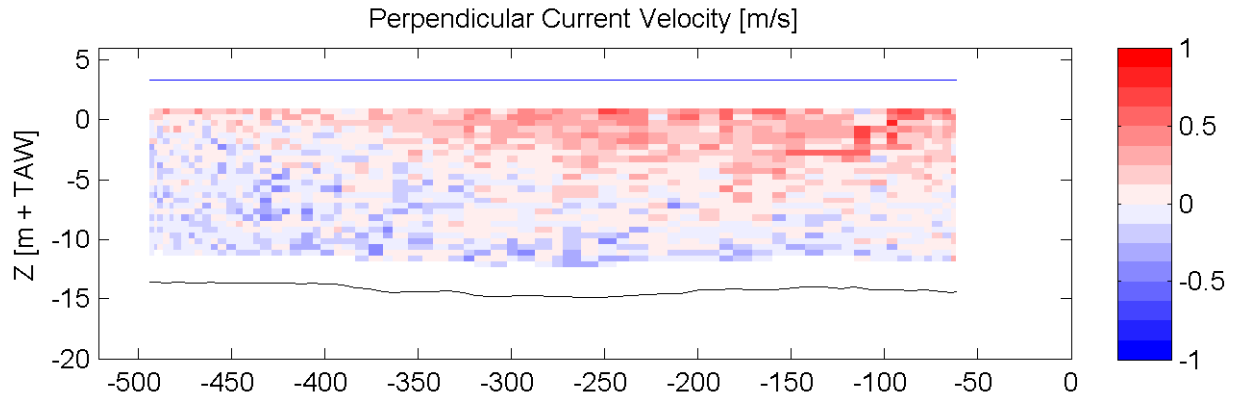
In association with : WL | delft hydraulics, GEMS International

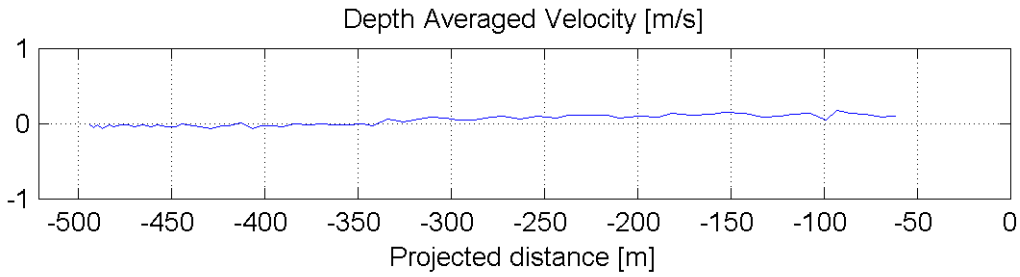
I/RA/11283/08.082/MSA

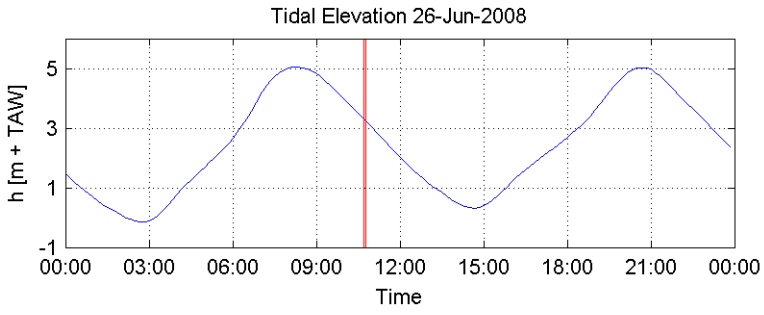
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6049DGDtrl.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

10:42 - 10:45

Time after HW [HH:MM]

2:24

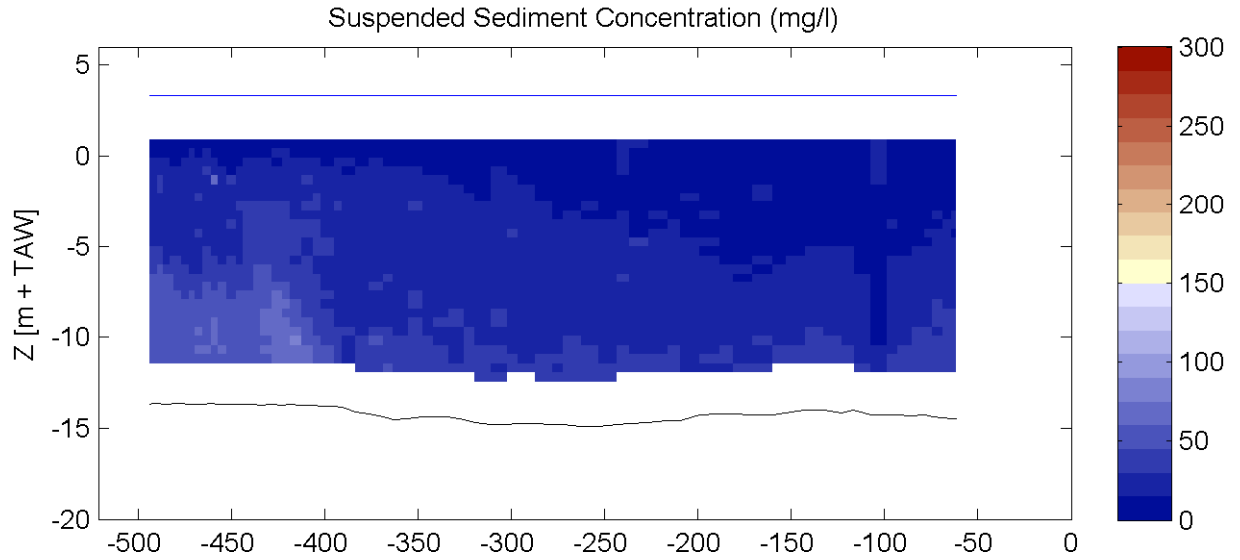
Data Processed by: IMDC

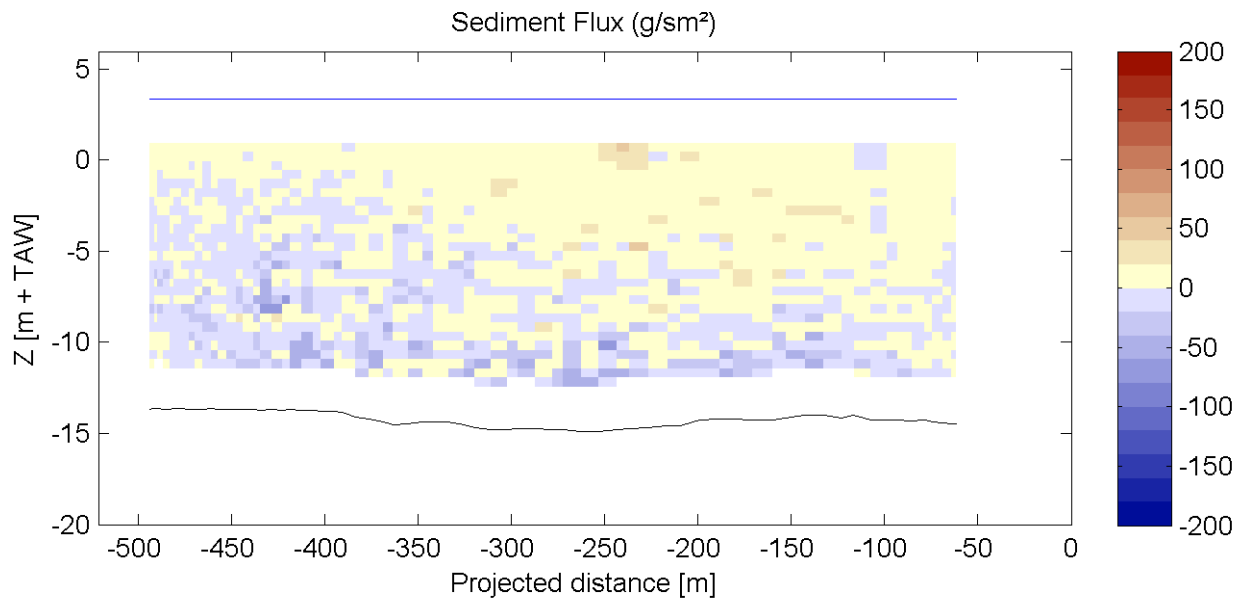
In association with : WL | delft hydraulics, GEMS International

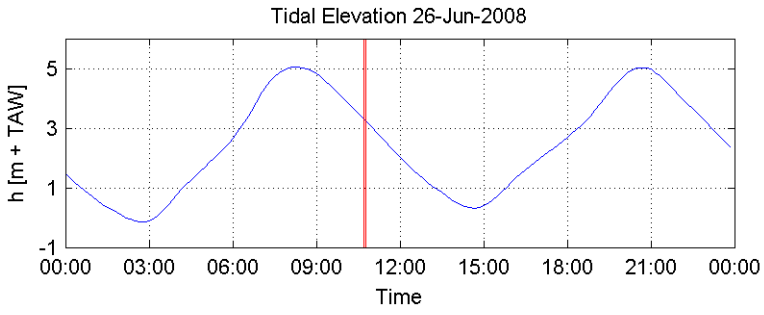
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6049DGDtrl.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

10:42 - 10:45

Time after HW [HH:MM]

2:24

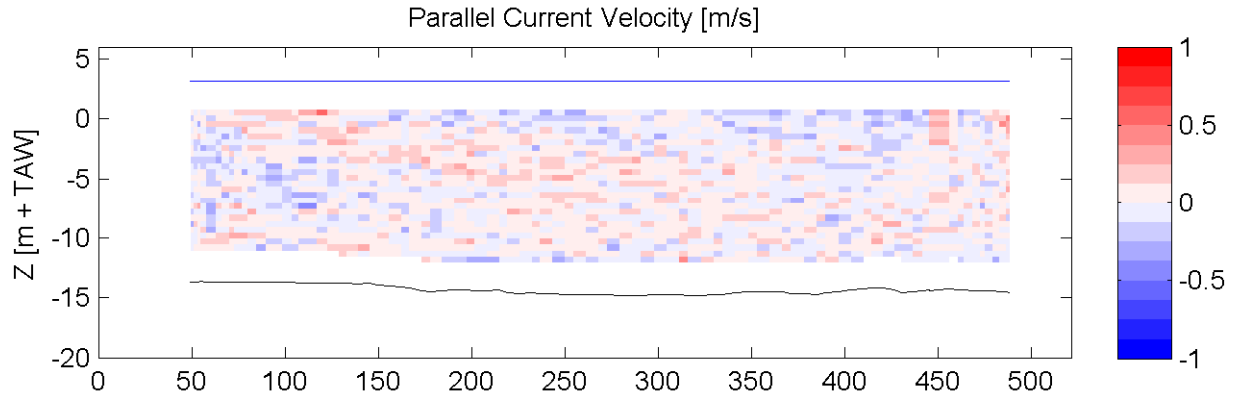
Data Processed by: IMDC

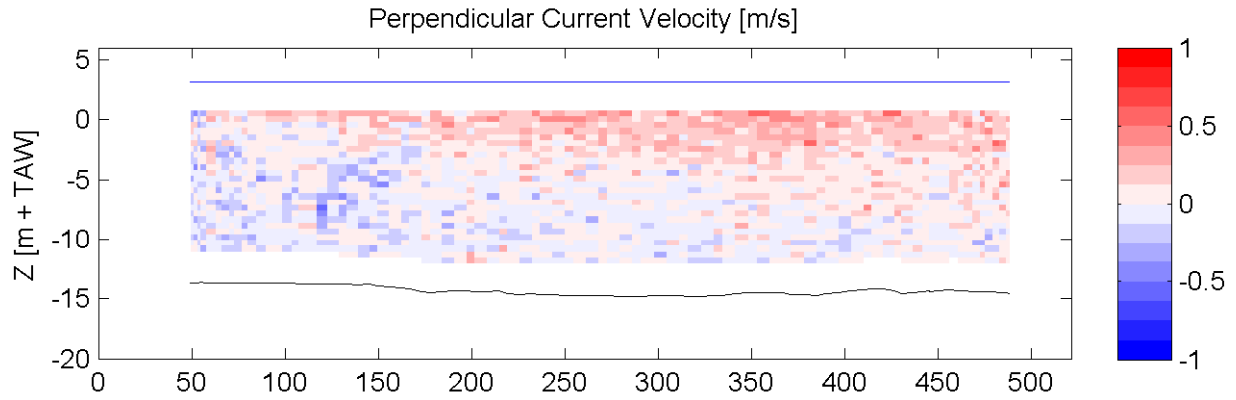
In association with : WL | delft hydraulics, GEMS International

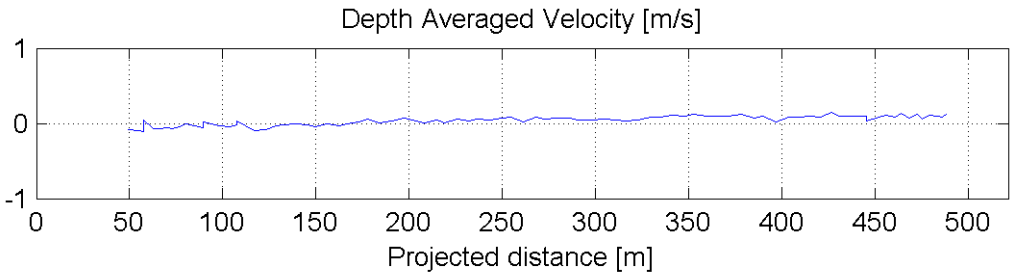
I/RA/11283/08.082/MSA

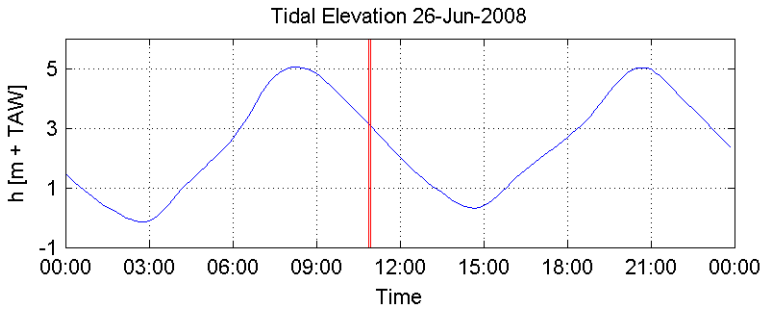
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6051DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

10:53 - 10:57

Time after HW [HH:MM]

2:35

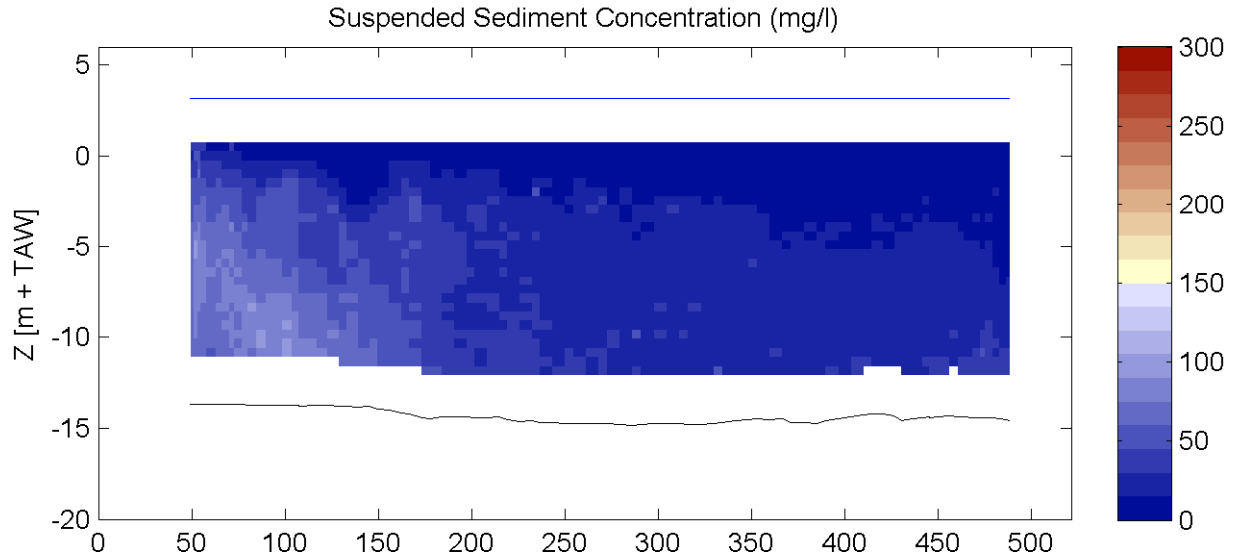
Data Processed by: IMDC

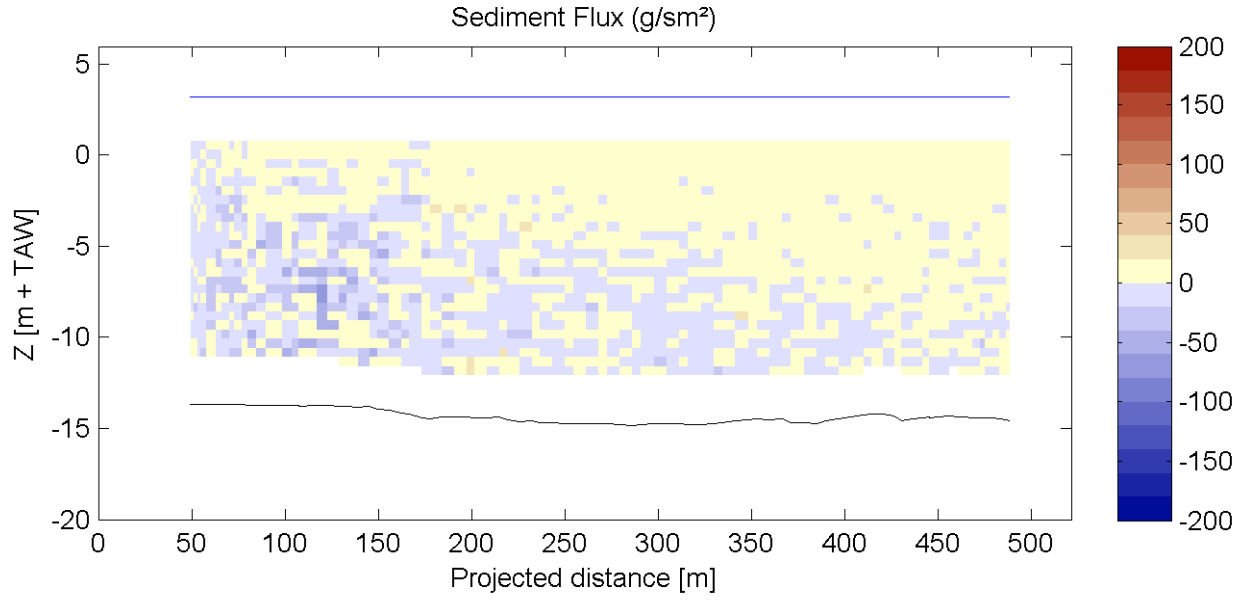
In association with : WL | delft hydraulics, GEMS International

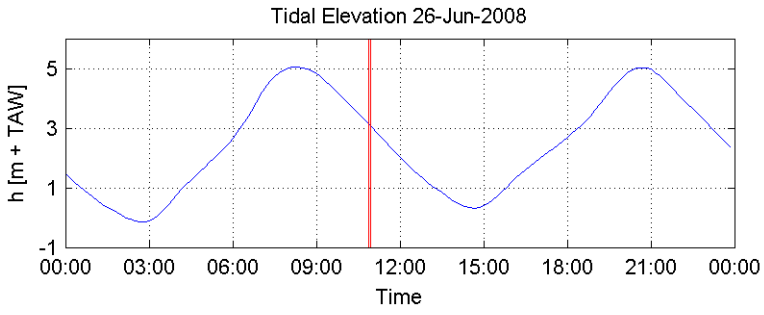
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6051DGDtlr_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

10:53 - 10:57

Time after HW [HH:MM]

2:35

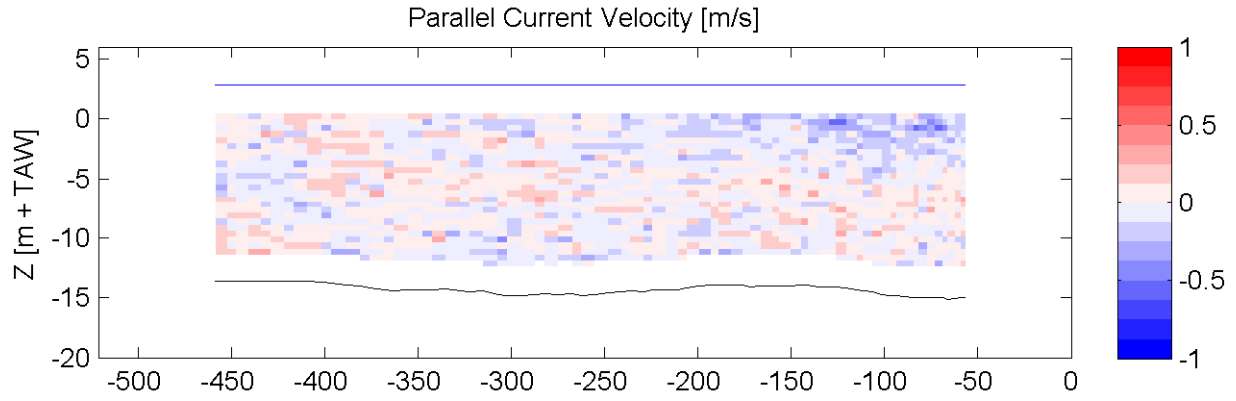
Data Processed by: IMDC

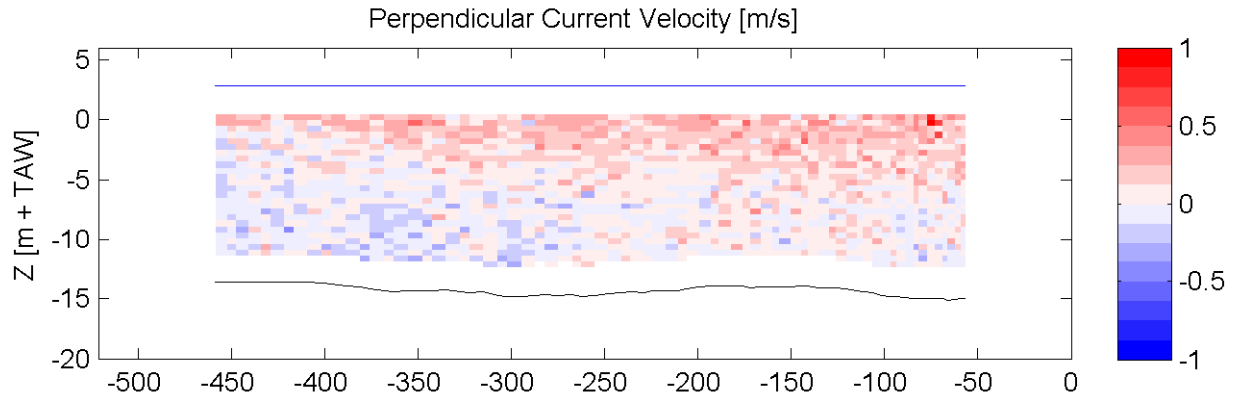
In association with : WL | delft hydraulics, GEMS International

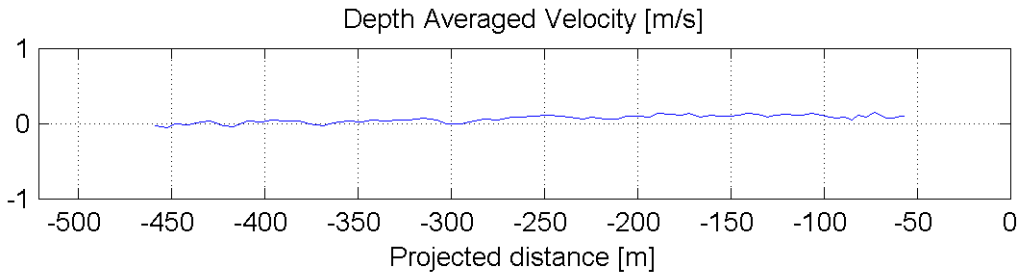
I/RA/11283/08.082/MSA

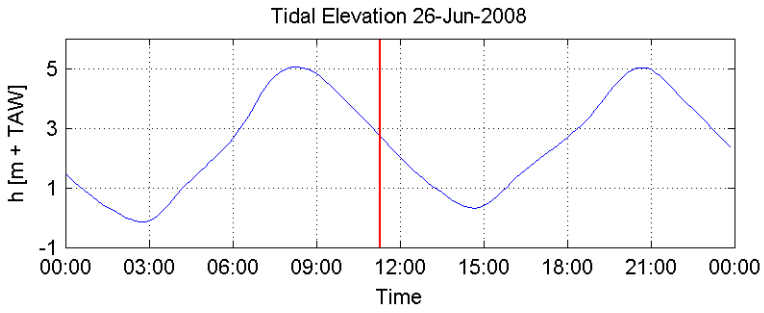
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6053DGDtrl_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

11:14 - 11:17

Time after HW [HH:MM]

2:56

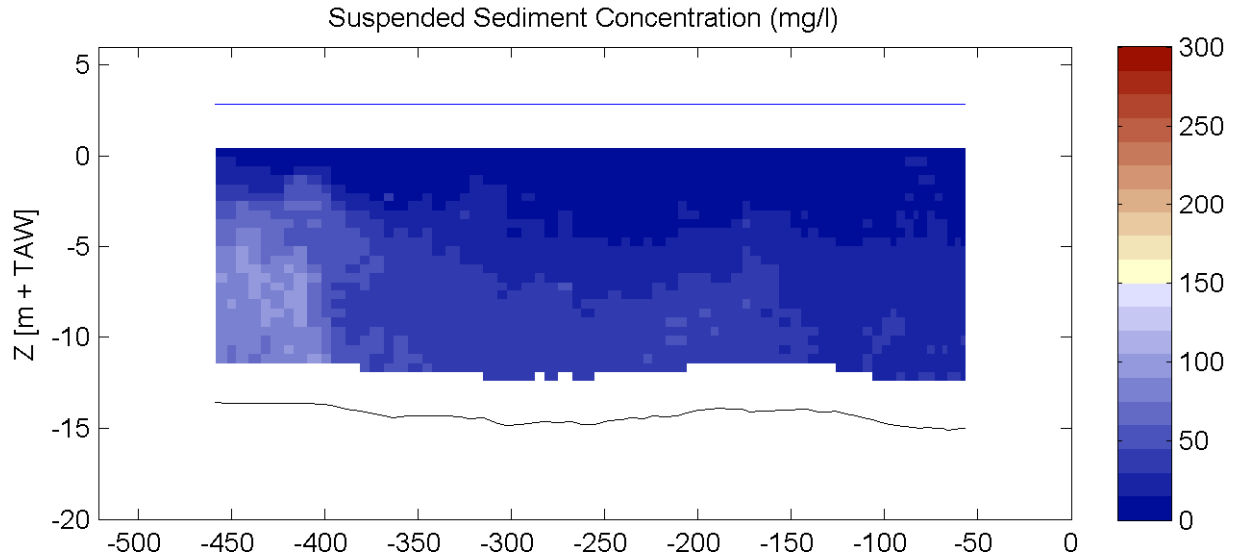
Data Processed by: IMDC

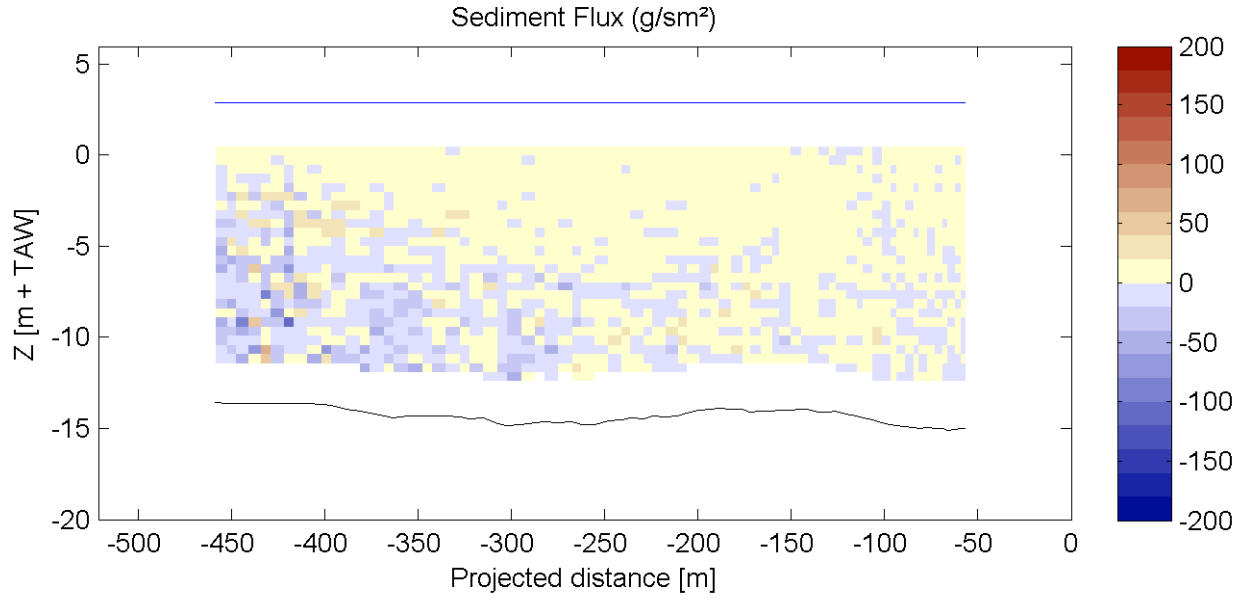
In association with : WL | delft hydraulics, GEMS International

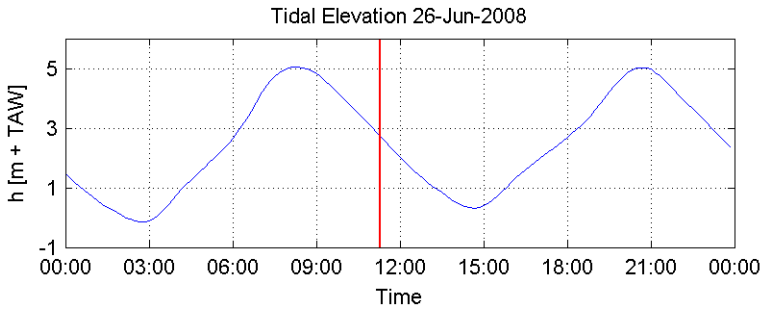
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6053DGDtrl_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

11:14 - 11:17

Time after HW [HH:MM]

2:56

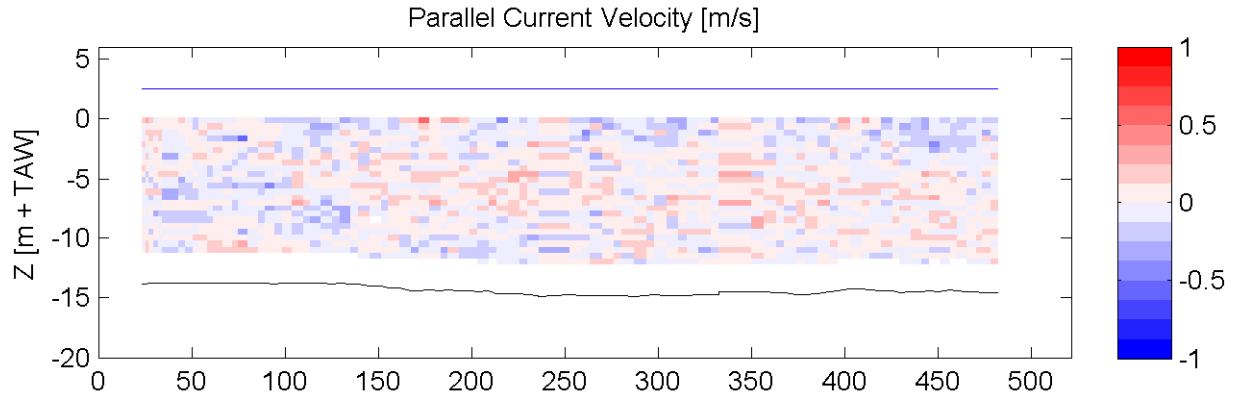
Data Processed by: IMDC

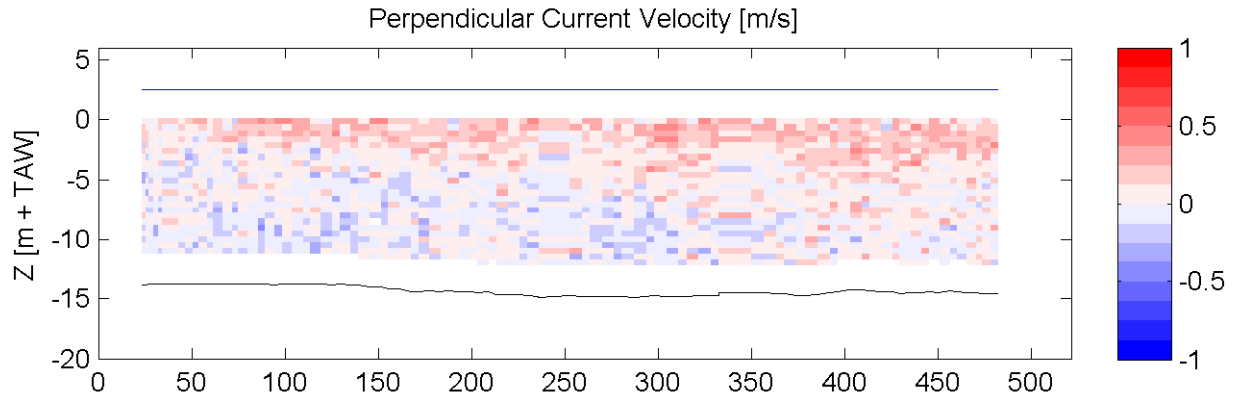
In association with : WL | delft hydraulics, GEMS International

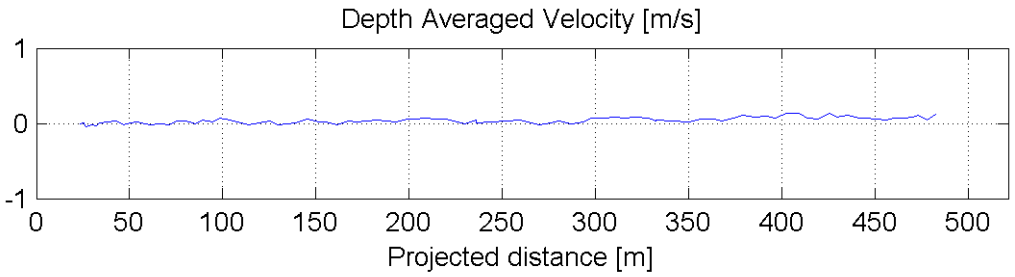
I/RA/11283/08.082/MSA

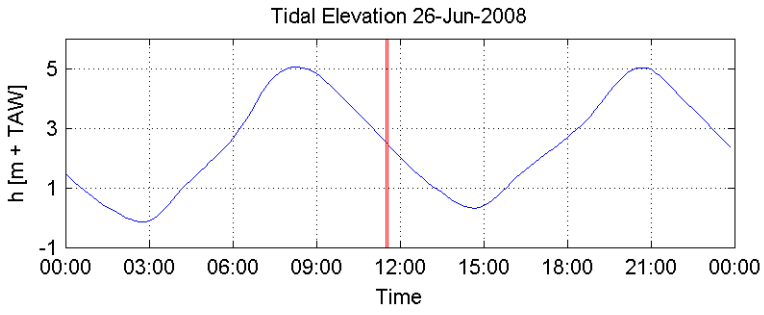
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6055DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

11:29 - 11:33

Time after HW [HH:MM]

3:11

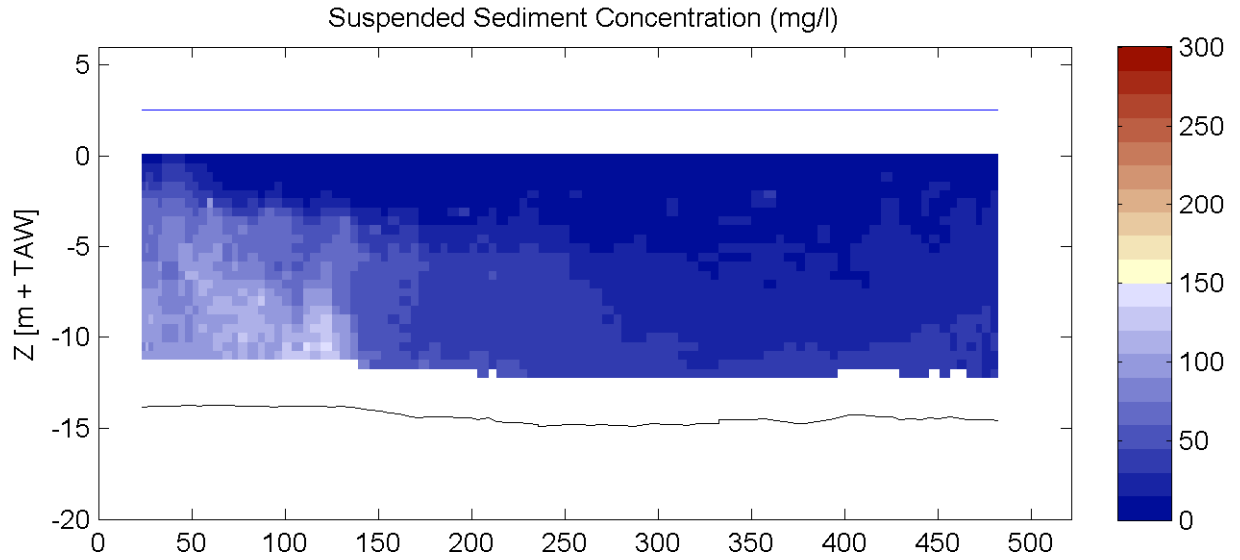
Data Processed by: IMDC

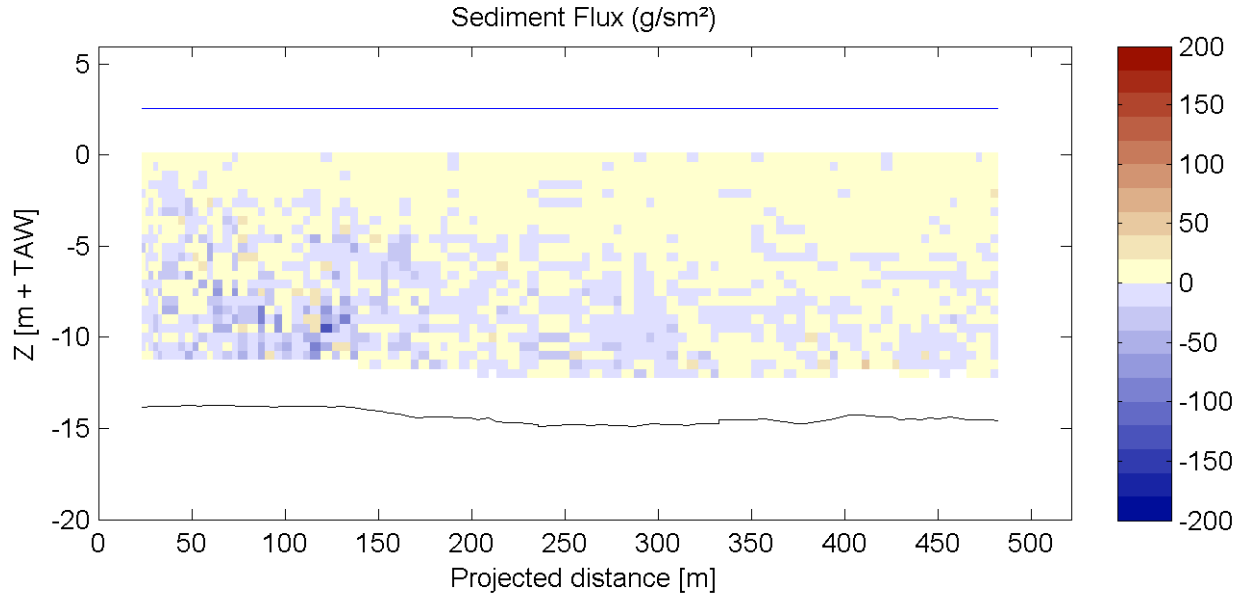
In association with : w.l | delft hydraulics, GEMS

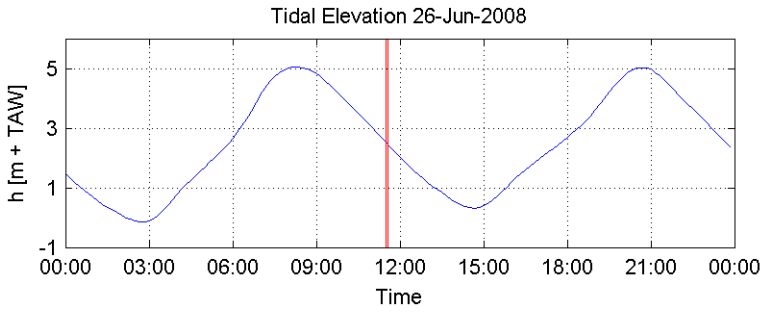
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6055DGDtlr_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

11:29 - 11:33

Time after HW [HH:MM]

3:11

Data Processed by: IMDC

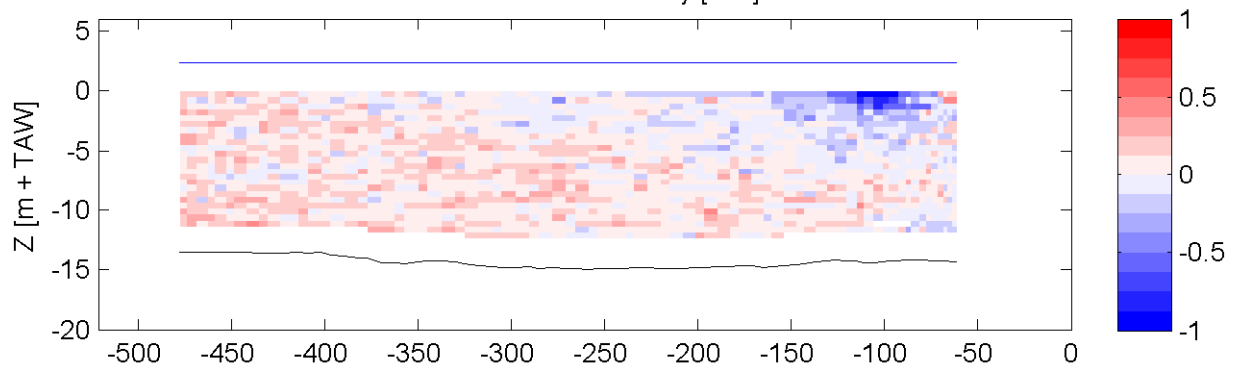
In association with : WL | delft hydraulics, GEMS International

I/RA/11283/08.082/MSA

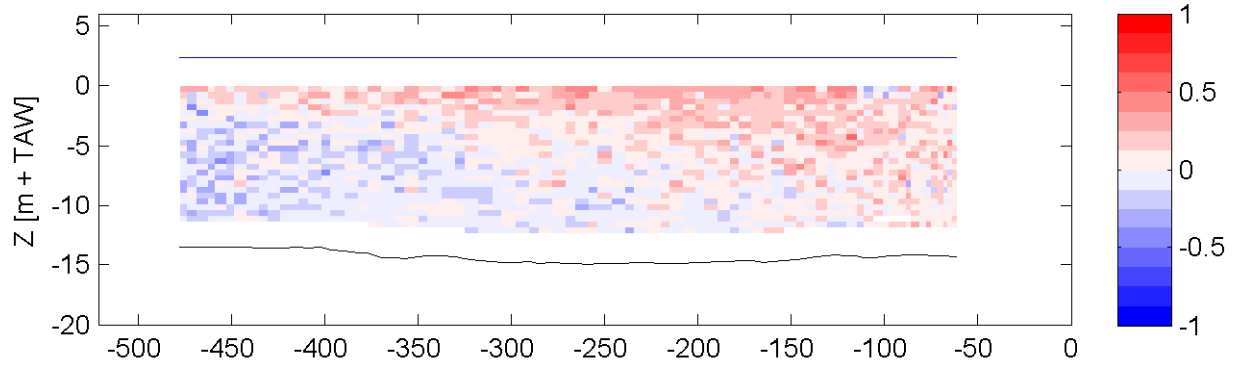
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6057DGDtrl_sub.csv	Location: Transect DGD

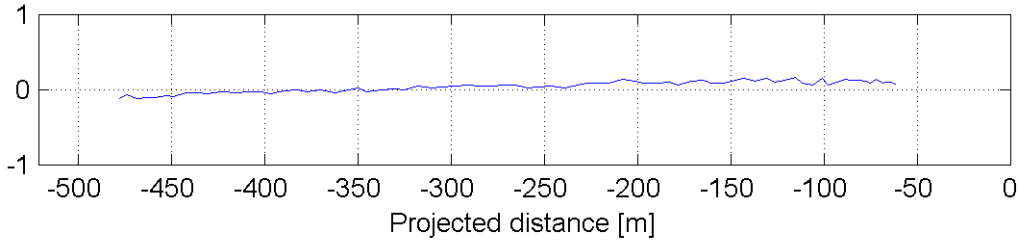
Parallel Current Velocity [m/s]



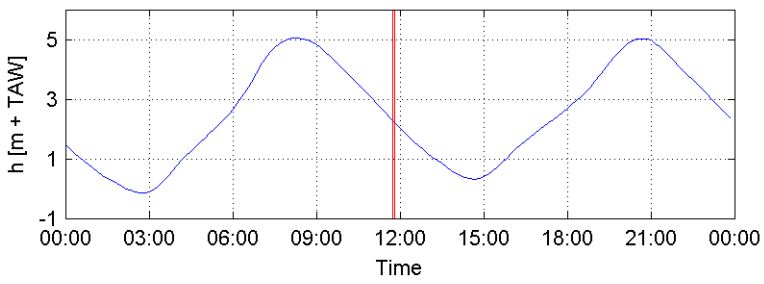
Perpendicular Current Velocity [m/s]



Depth Averaged Velocity [m/s]



Tidal Elevation 26-Jun-2008



HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

11:44 - 11:48

Time after HW [HH:MM]

3:26

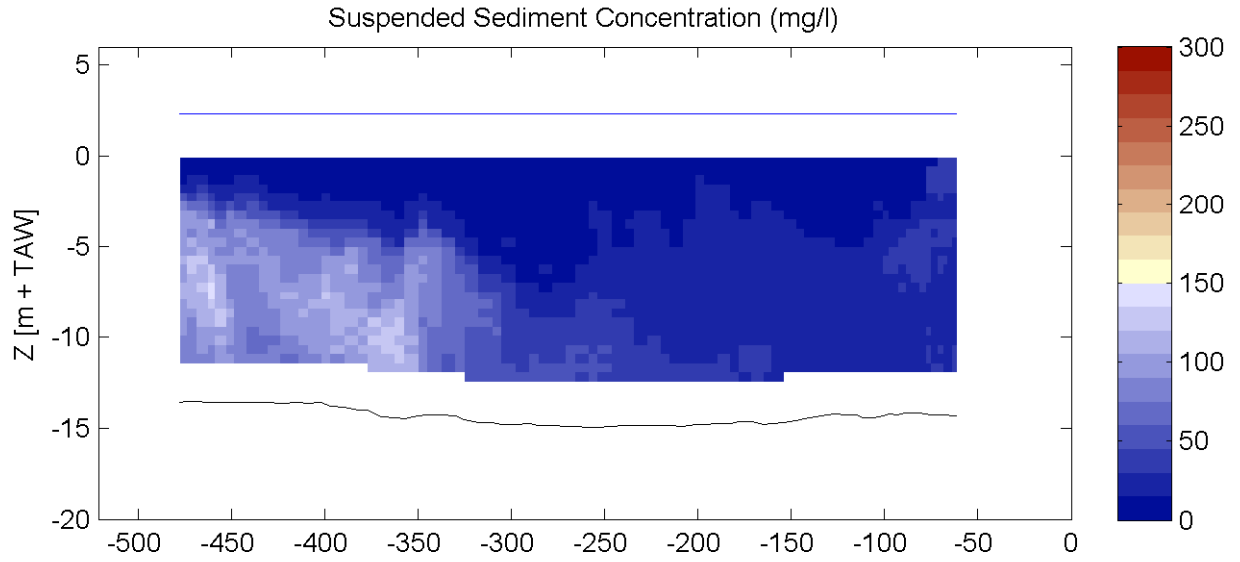
Data Processed by: IMDC

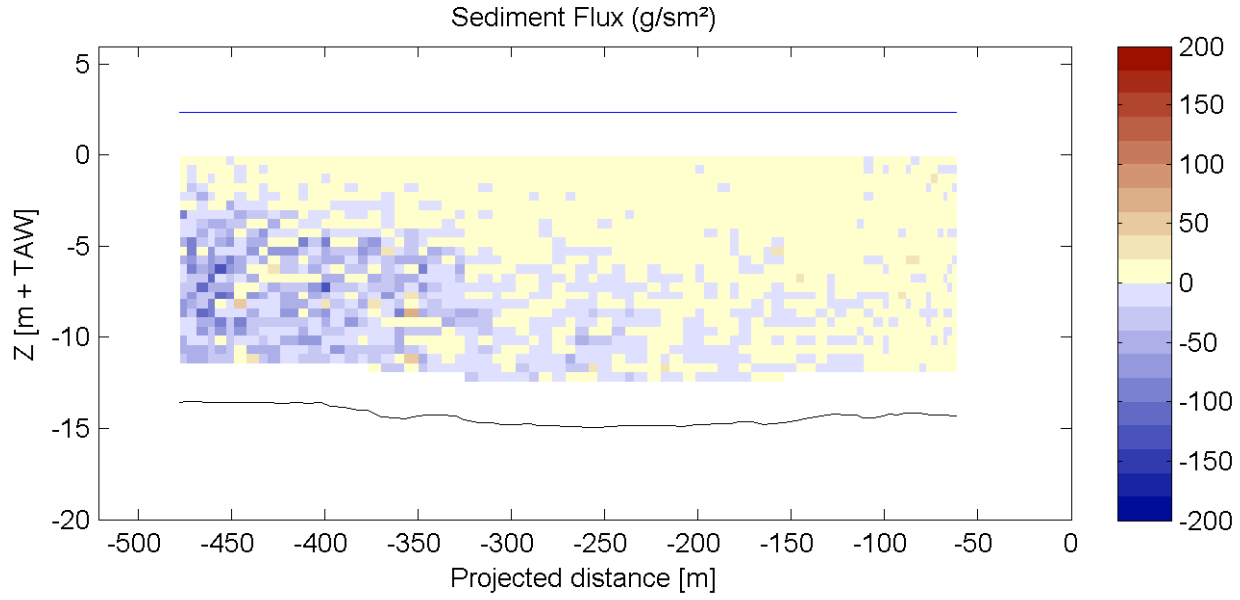
In association with : WL | delft hydraulics, GEMS International

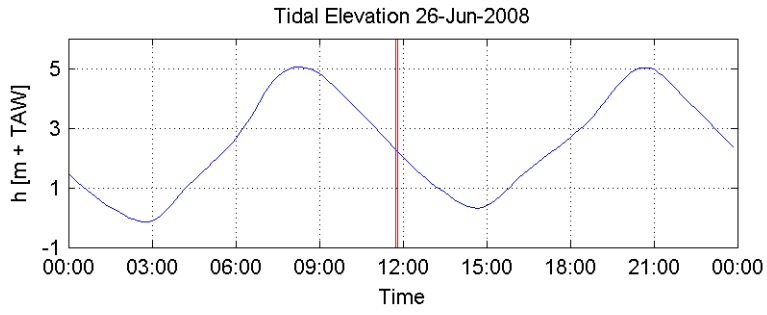
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6057DGDtrl_sub.csv	Location: Transect DGD







HW/LW: 08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

11:44 - 11:48

Time after HW [HH:MM]

3:26

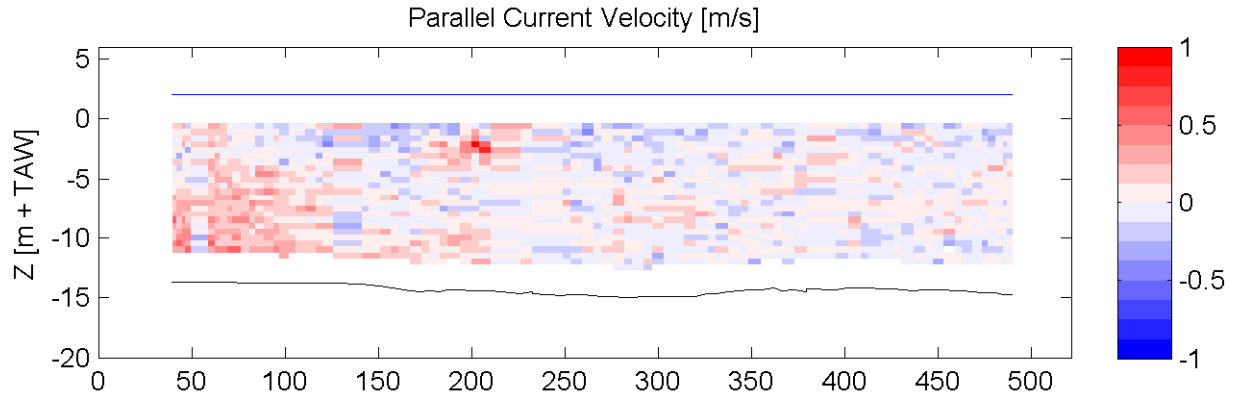
Data Processed by: IMDC

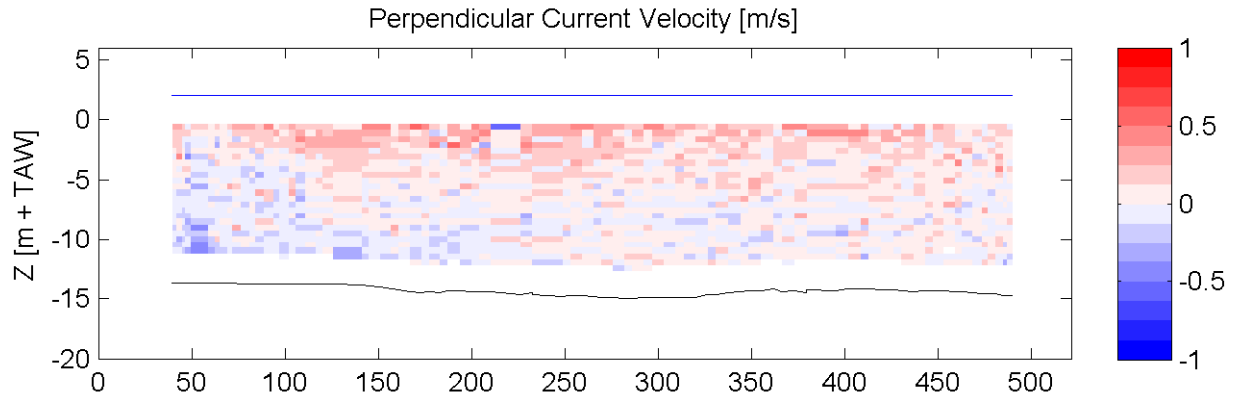
In association with : WL | delft hydraulics, GEMS International

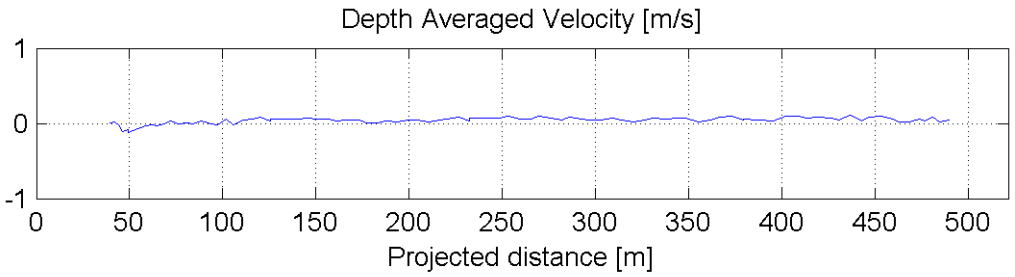
I/RA/11283/08.082/MSA

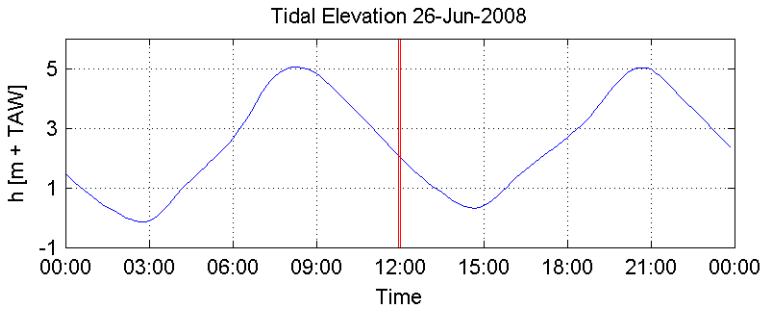
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6059DGDtlr.csv	Location: Transect DGD









HW/LW: 08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

11:57 - 12:01

Time after HW [HH:MM]

3:39

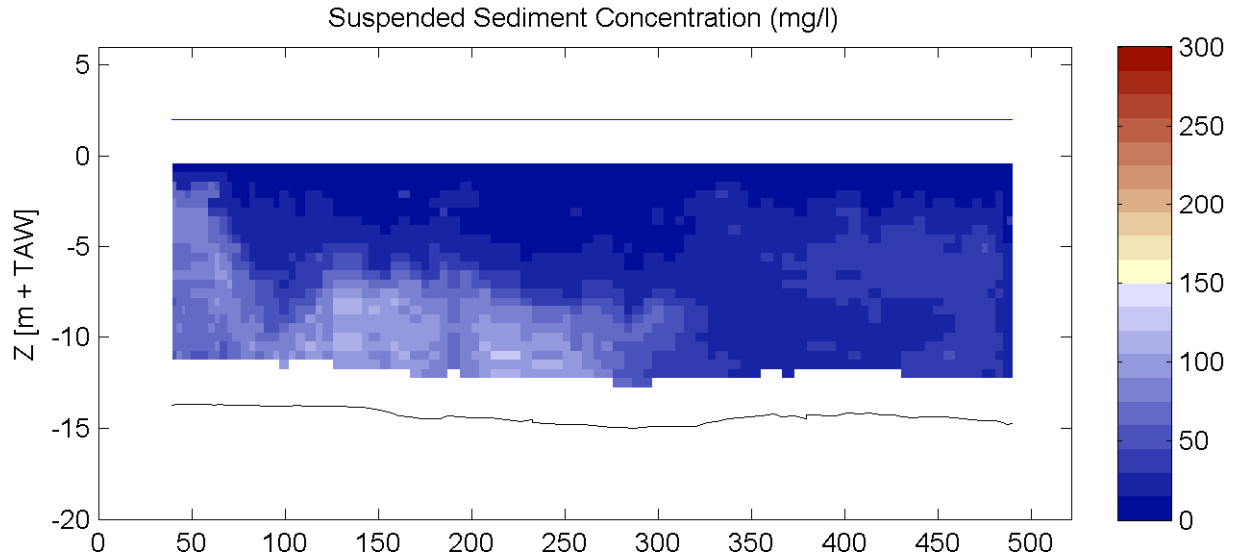
Data Processed by: IMDC

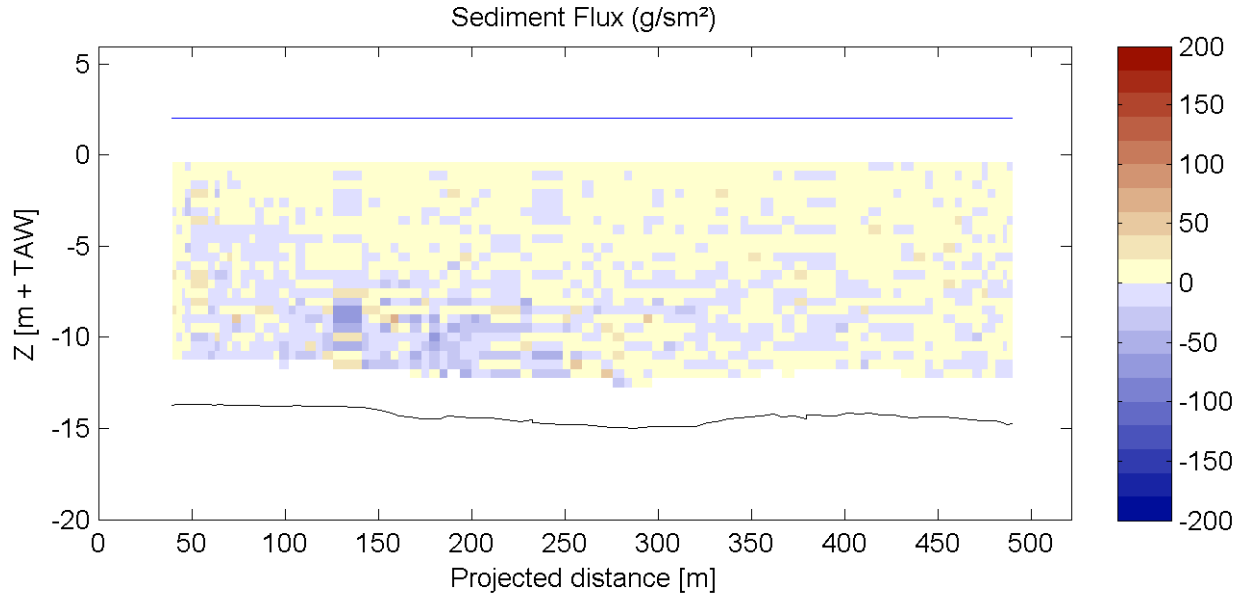
In association with : GEMS

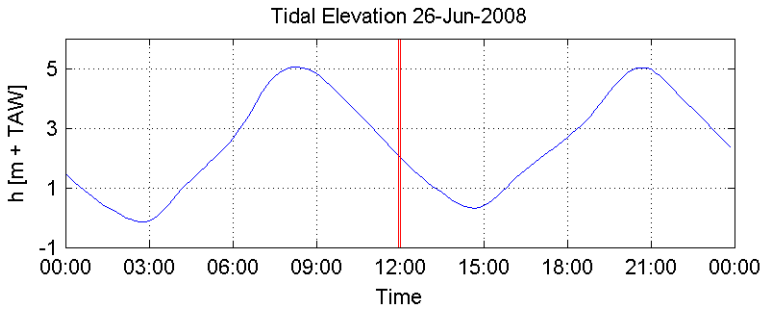
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6059DGDtlr.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

11:57 - 12:01

Time after HW [HH:MM]

3:39

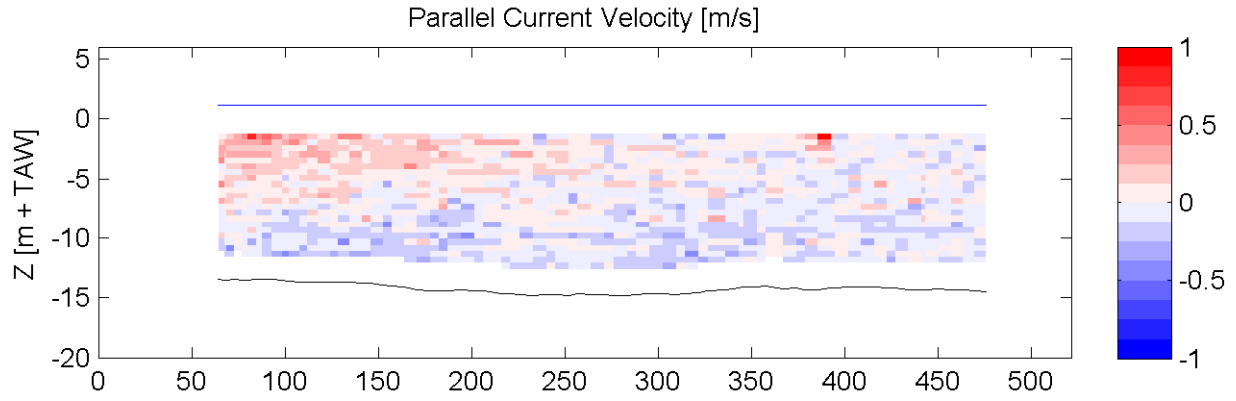
Data Processed by: IMDC

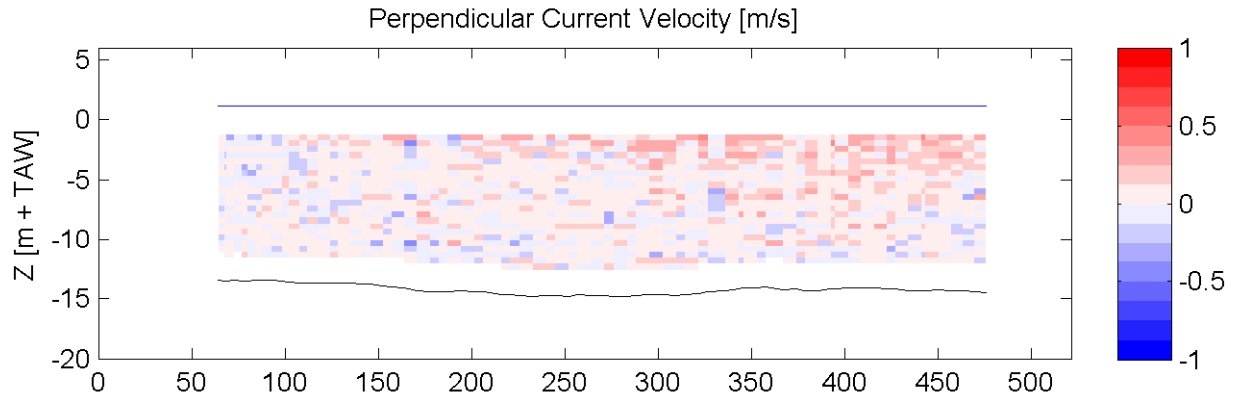
In association with : GEMS

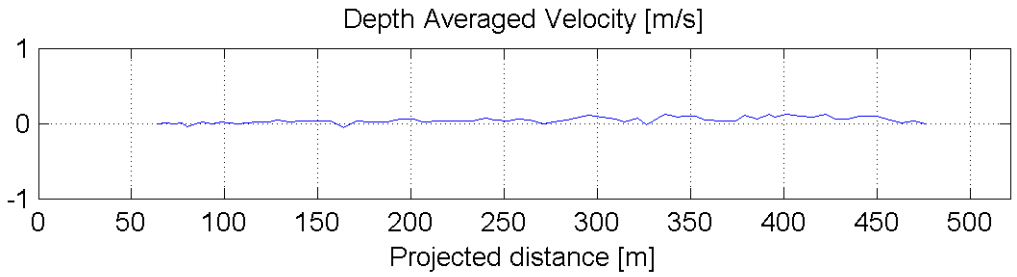
I/RA/11283/08.082/MSA

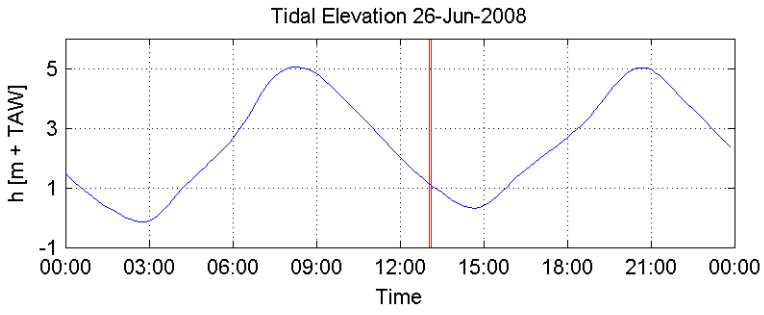
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6061DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

13:04 - 13:07

Time after HW [HH:MM]

4:45

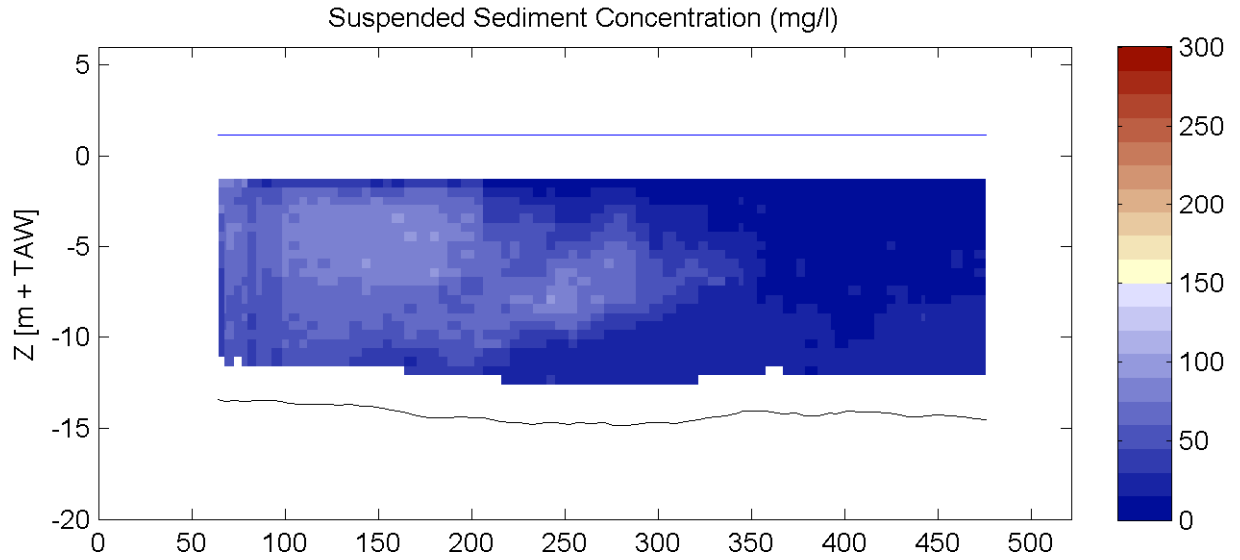
Data Processed by: IMDC

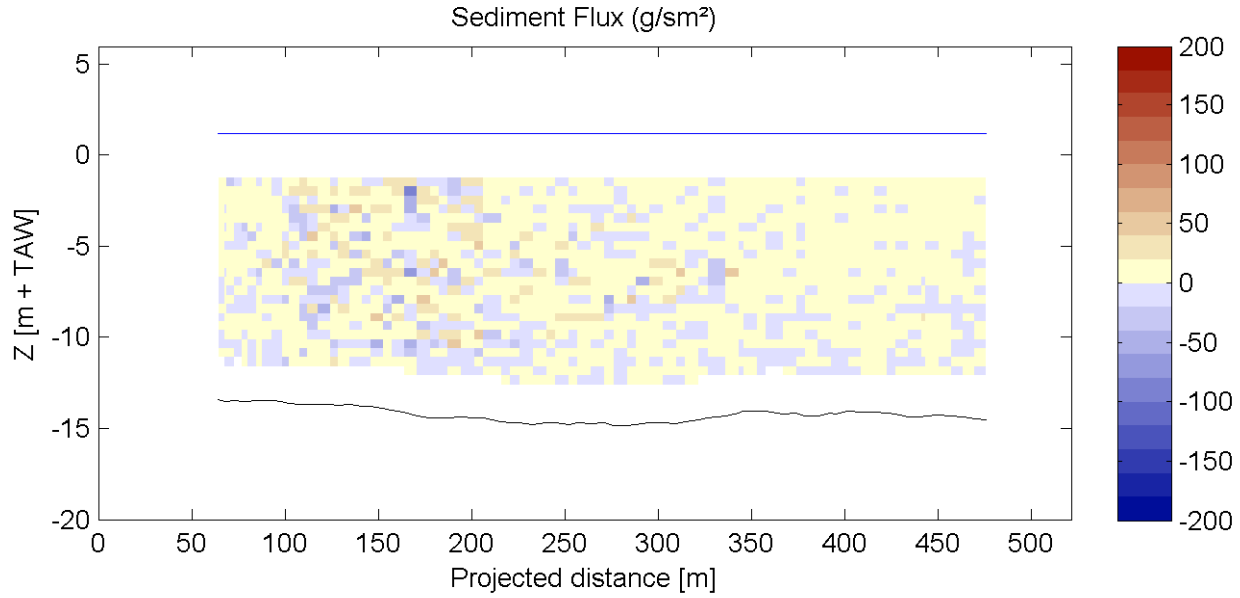
In association with : w.l | delft hydraulics, GEMS International

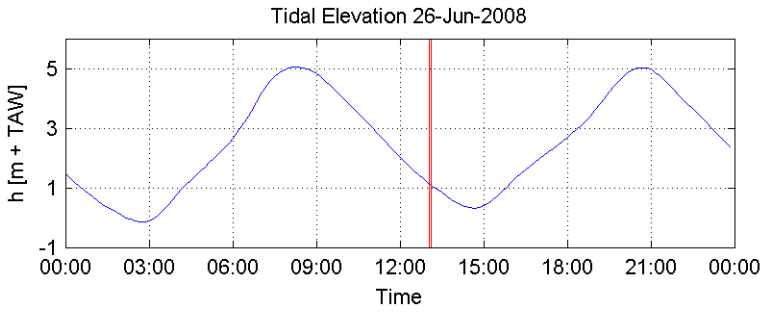
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6061DGDtlr_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

13:04 - 13:07

Time after HW [HH:MM]

4:45

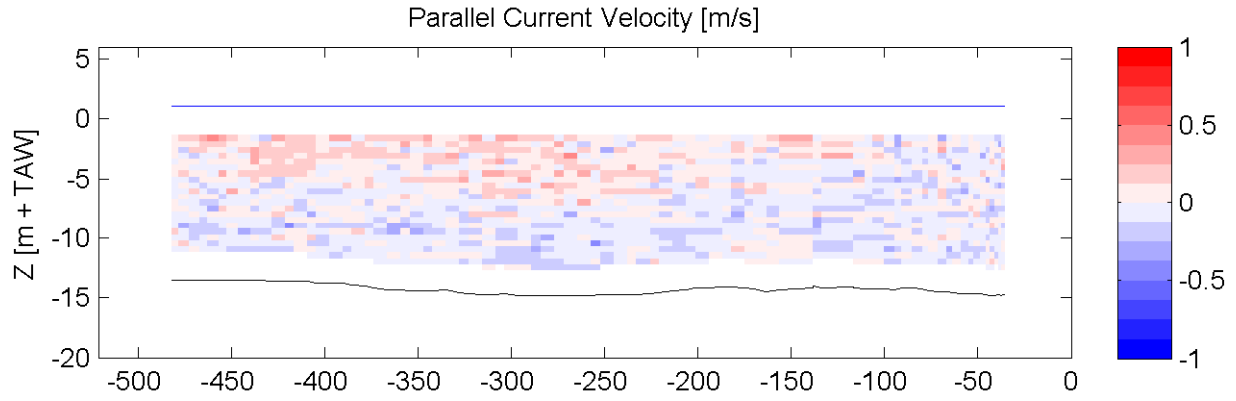
Data Processed by: IMDC

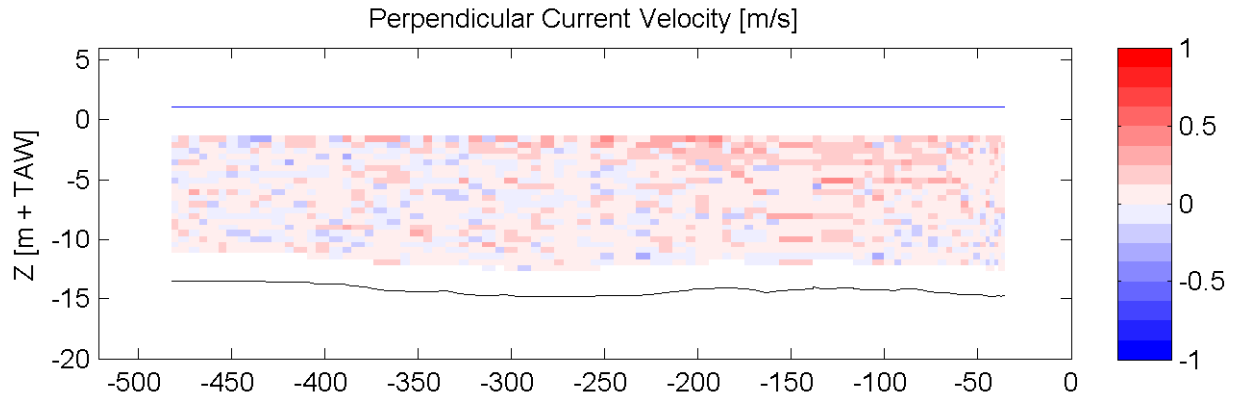
In association with : WL | delft hydraulics, GEMS International

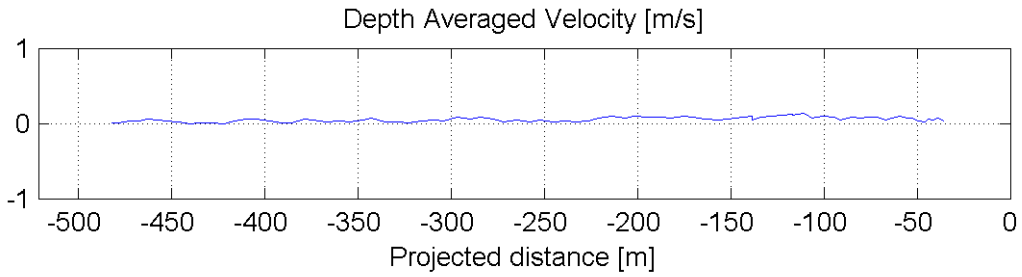
I/RA/11283/08.082/MSA

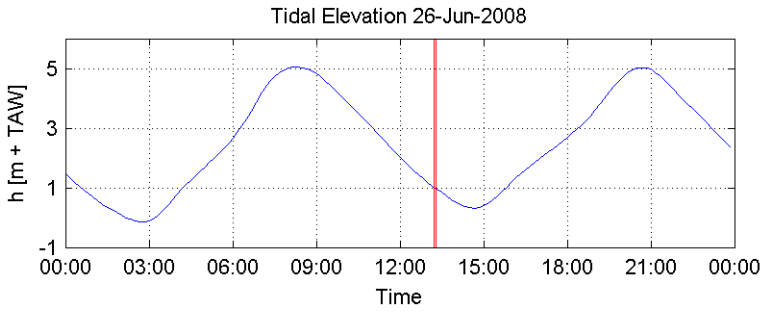
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6063DGDtrl_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

13:14 - 13:17

Time after HW [HH:MM]

4:55

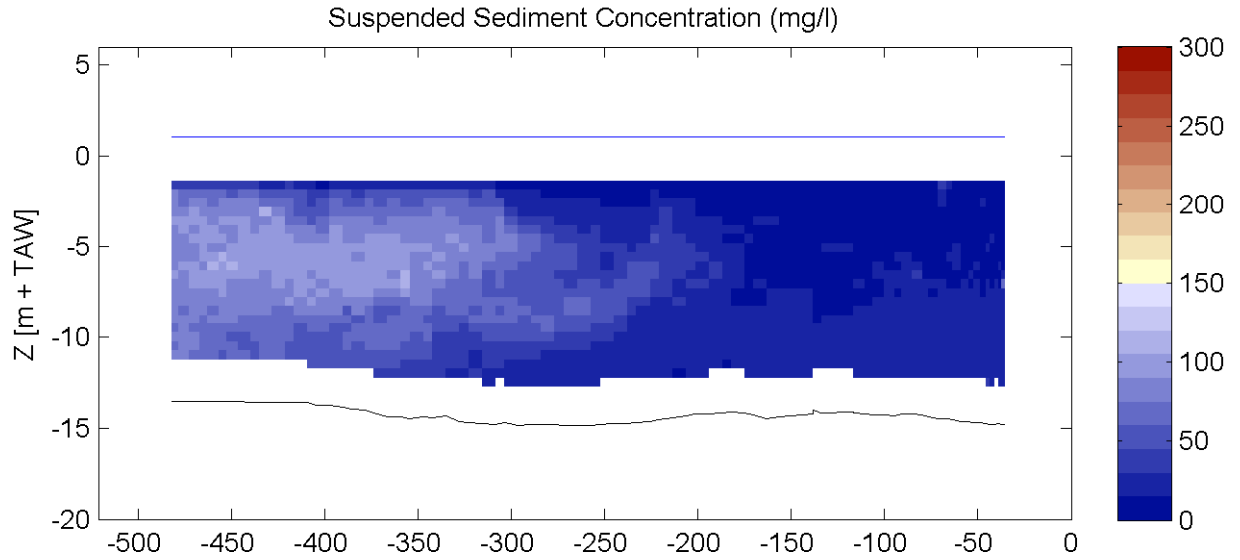
Data Processed by: IMDC

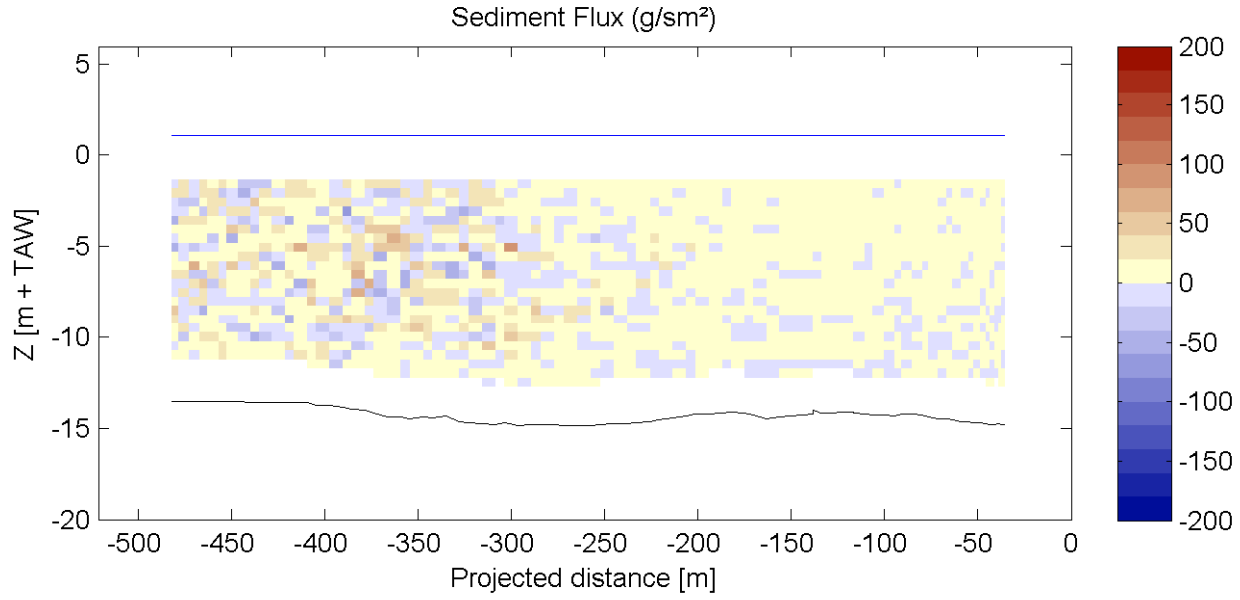
In association with : w.l | delft hydraulics, GEMS International

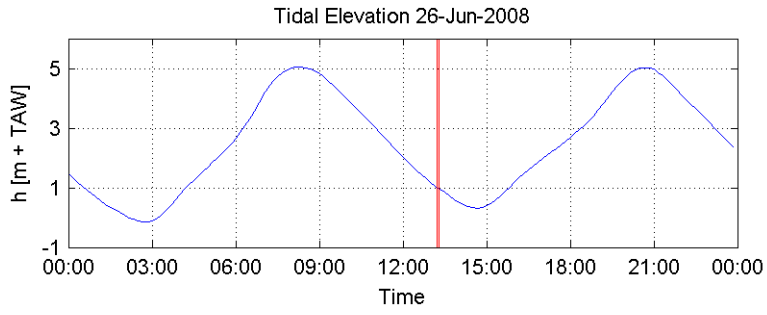
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6063DGDtrl_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

13:14 - 13:17

Time after HW [HH:MM]

4:55

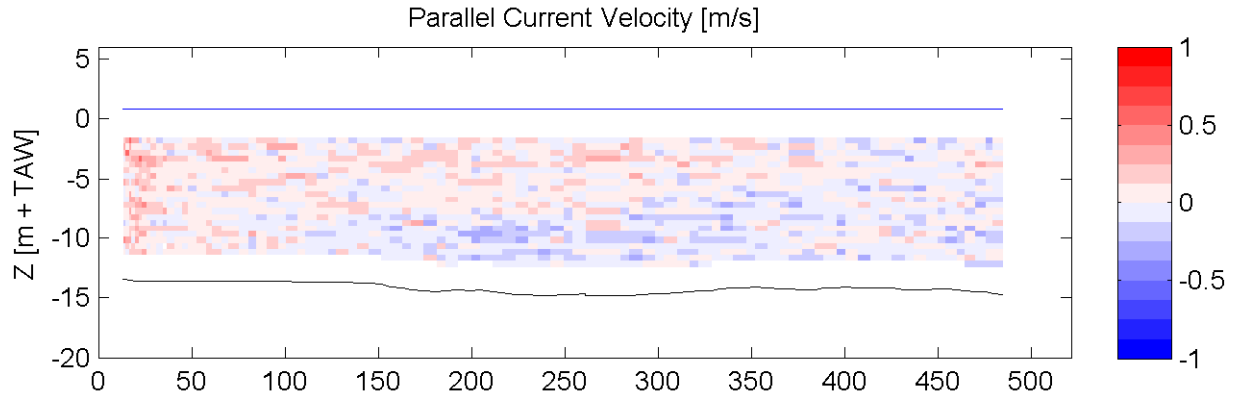
Data Processed by: IMDC

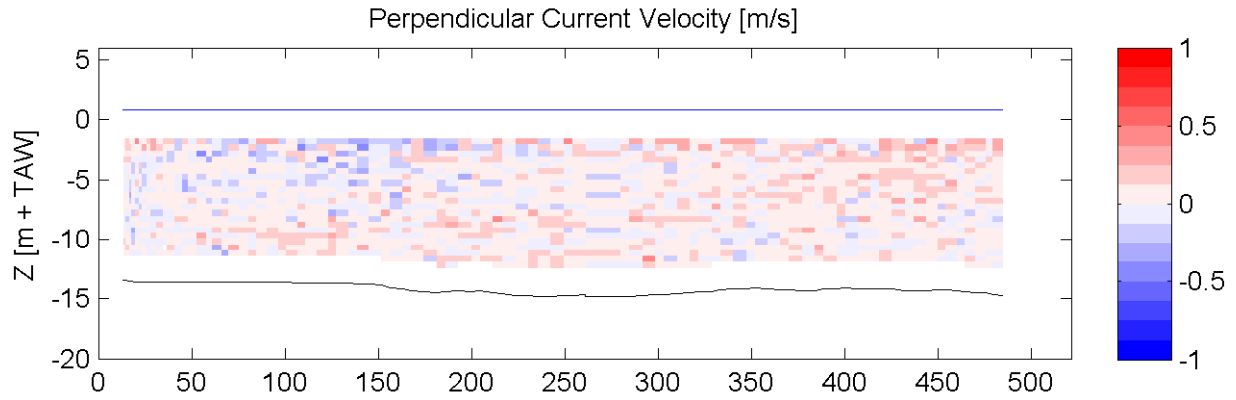
In association with : WL | delft hydraulics, GEMS International

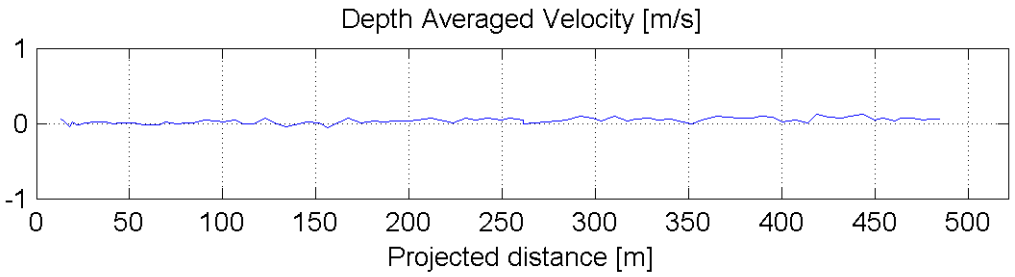
I/RA/11283/08.082/MSA

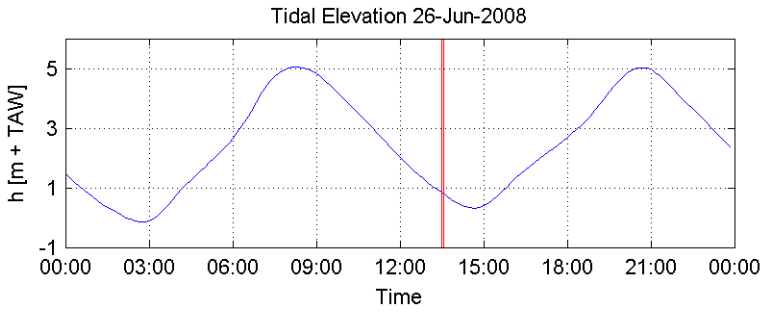
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6065DGDtlr.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

13:29 - 13:33

Time after HW [HH:MM]

5:11

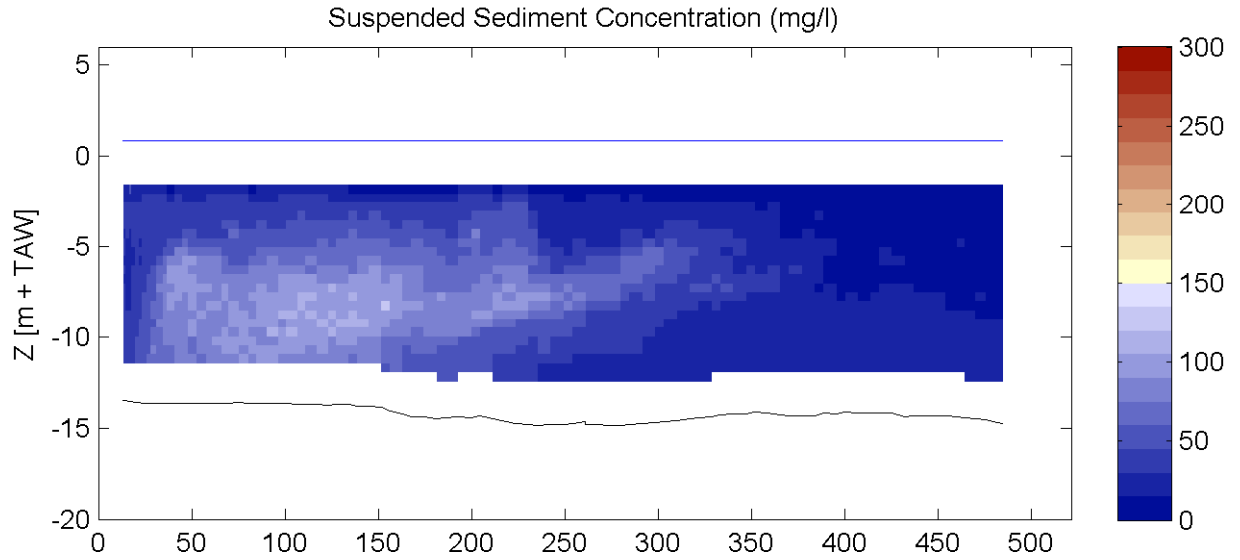
Data Processed by: IMDC

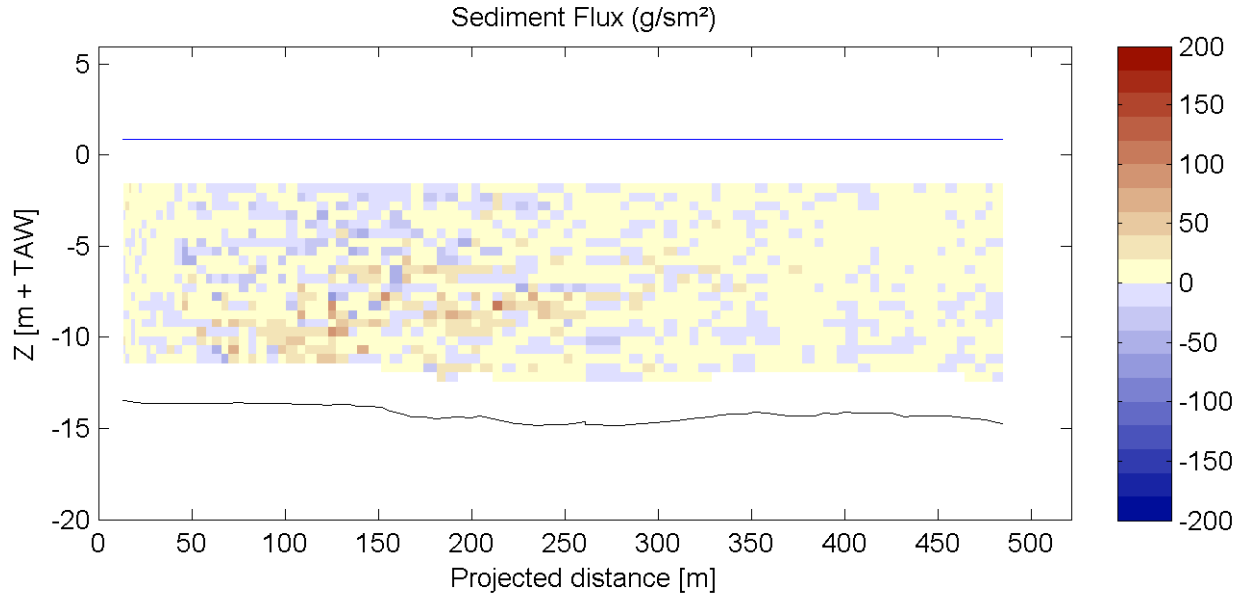
In association with : w.l | delft hydraulics, GEMS

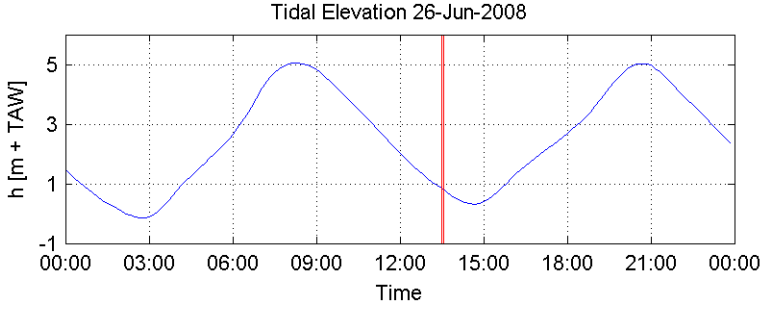
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6065DGDtlr.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

13:29 - 13:33

Time after HW [HH:MM]

5:11

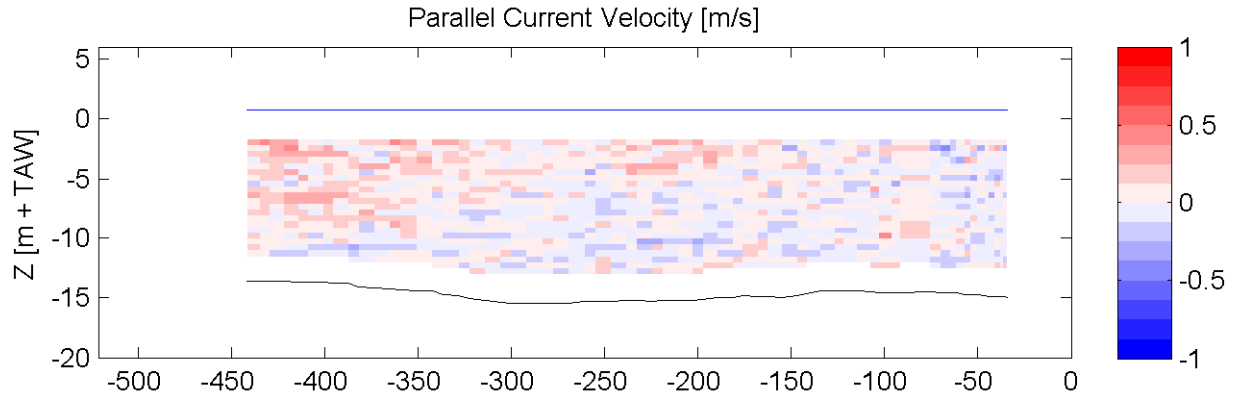
Data Processed by: IMDC

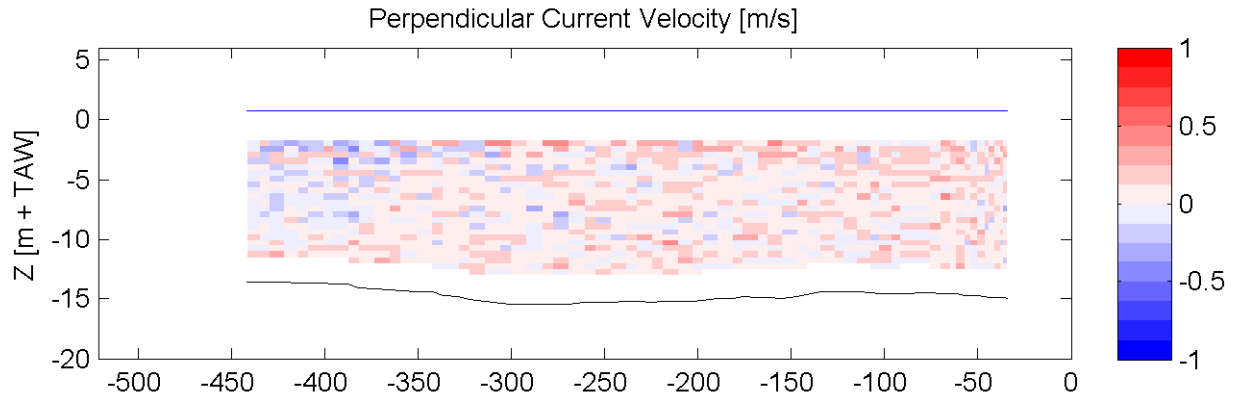
In association with : WL | delft hydraulics, GEMS International

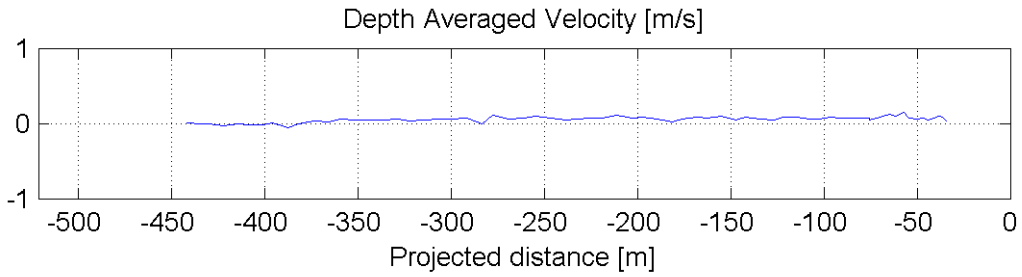
I/RA/11283/08.082/MSA

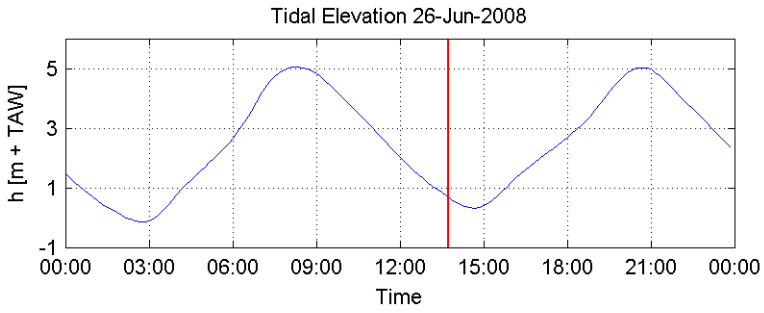
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6067DGDtrl_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

13:41 - 13:44

Time after HW [HH:MM]

5:23

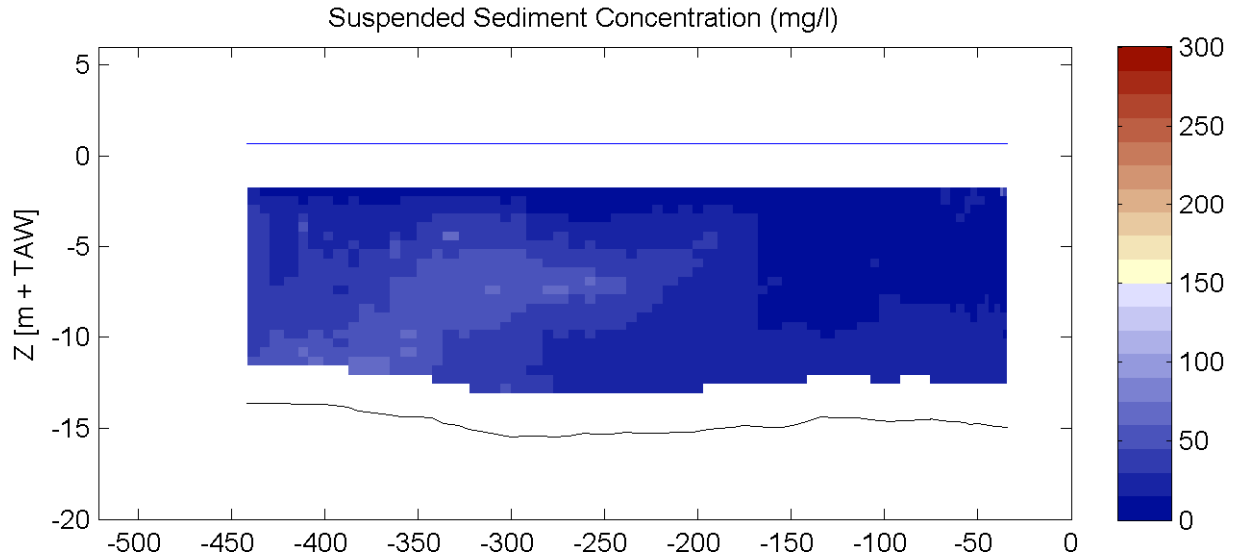
Data Processed by: IMDC

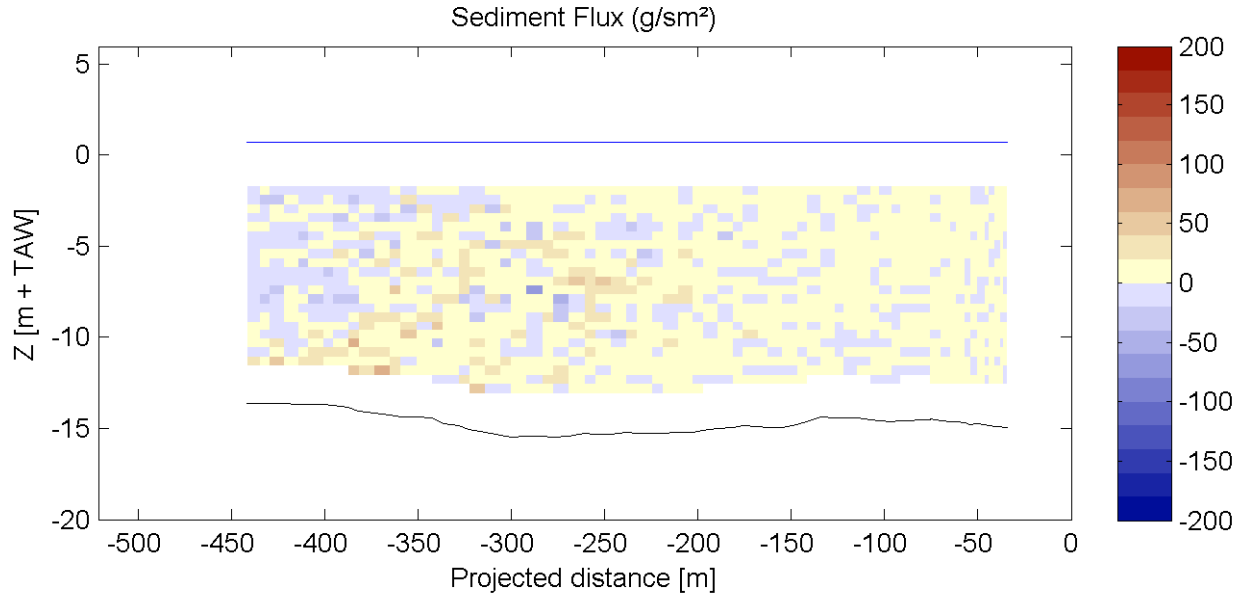
In association with : w.l | delft hydraulics, GEMS

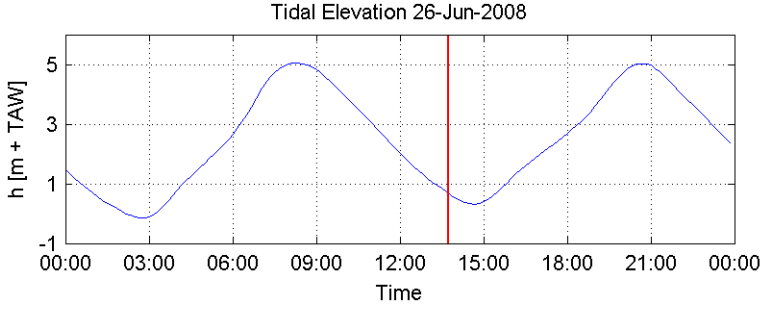
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6067DGDtrl_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

13:41 - 13:44

Time after HW [HH:MM]

5:23

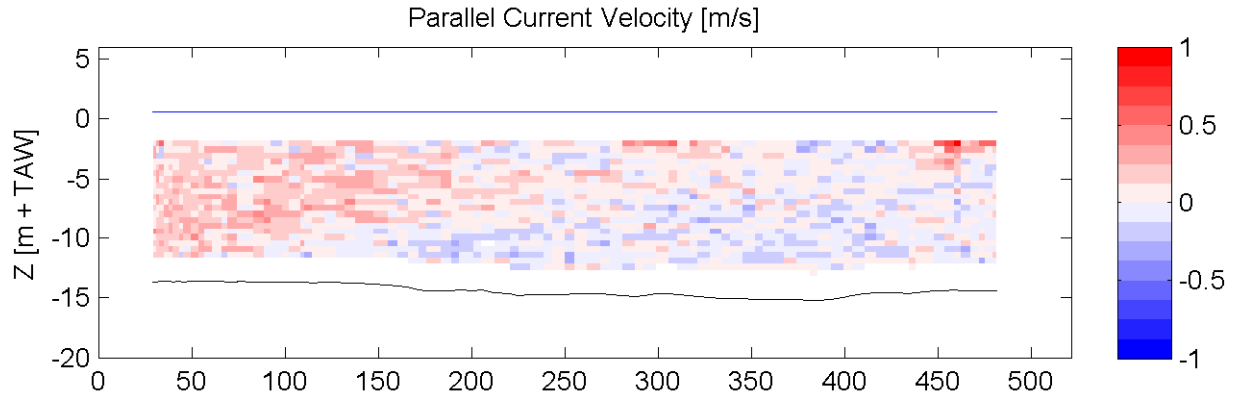
Data Processed by: IMDC

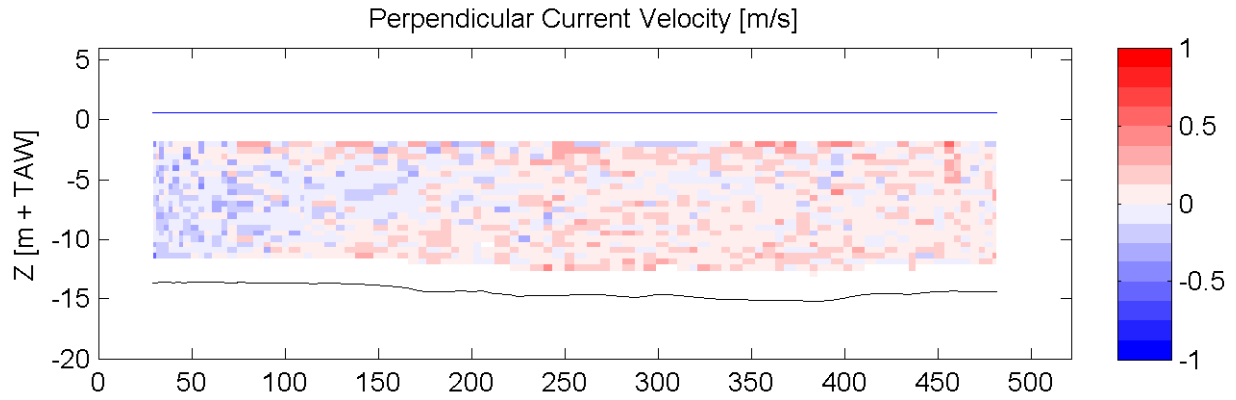
In association with : WL | delft hydraulics, GEMS International

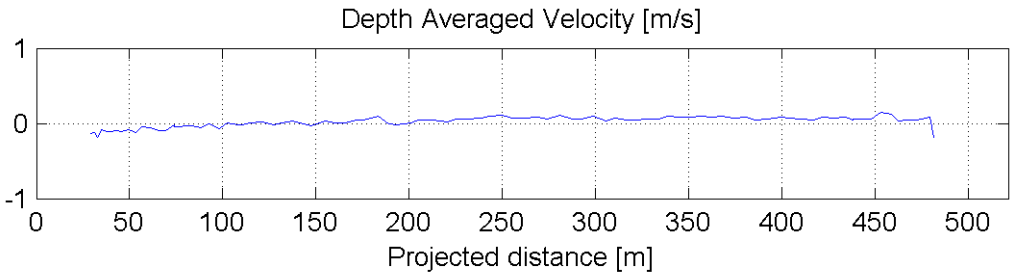
I/RA/11283/08.082/MSA

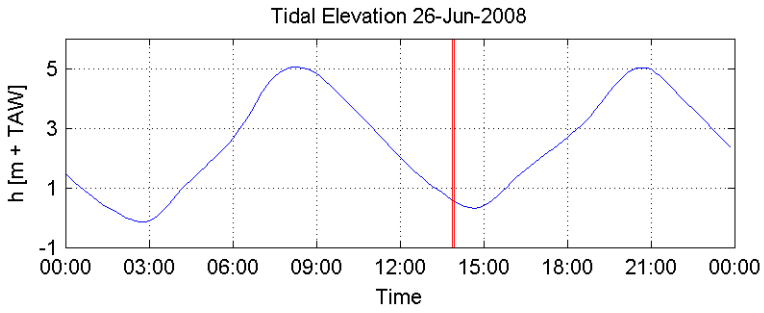
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6069DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

13:53 - 13:57

Time after HW [HH:MM]

5:35

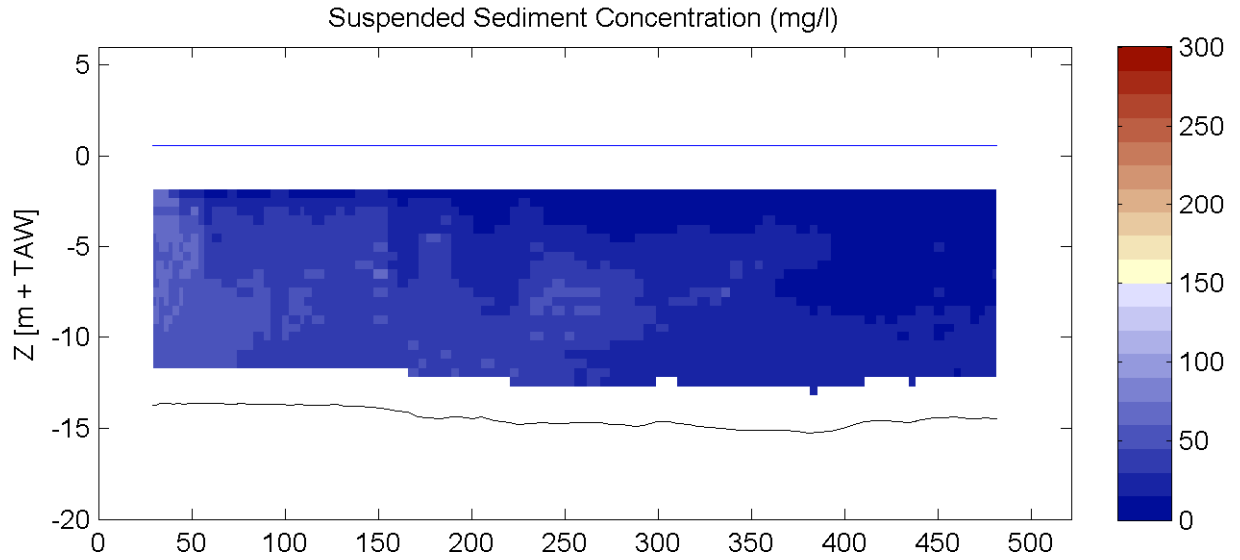
Data Processed by: IMDC

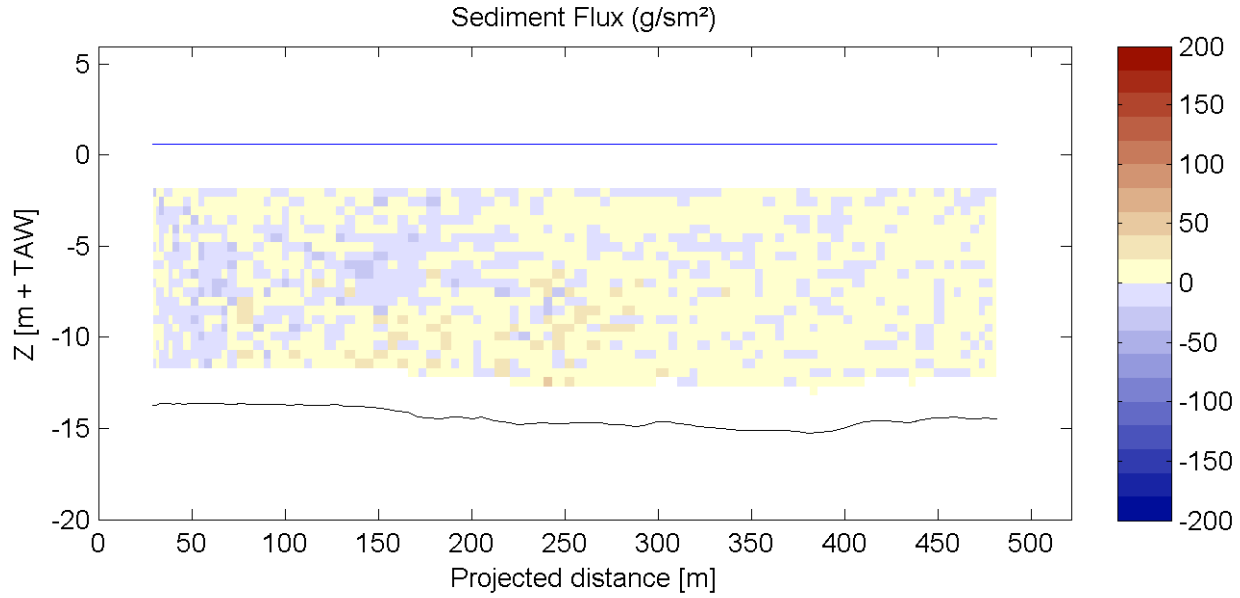
In association with : w.l | delft hydraulics, GEMS

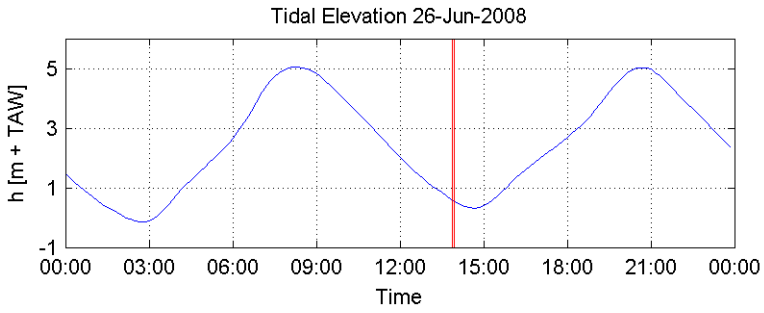
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6069DGDtlr_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

13:53 - 13:57

Time after HW [HH:MM]

5:35

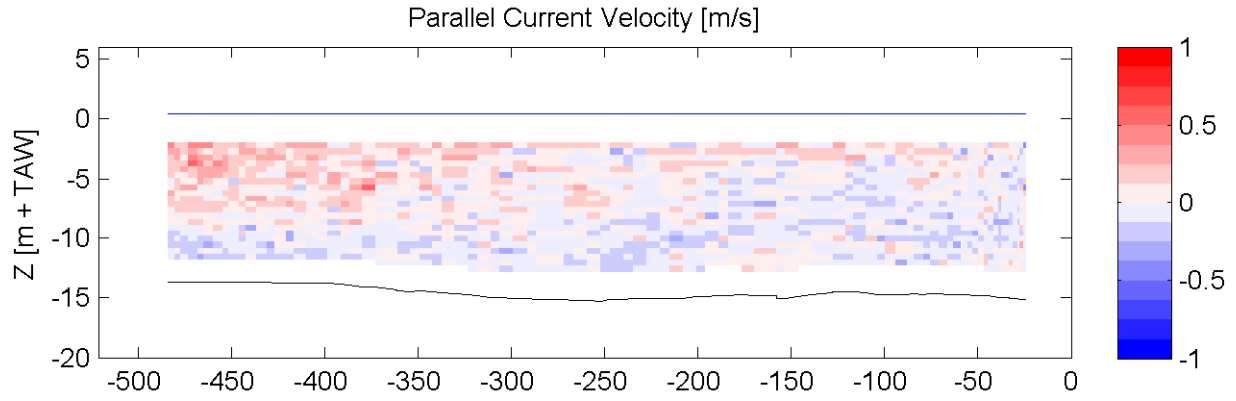
Data Processed by: IMDC

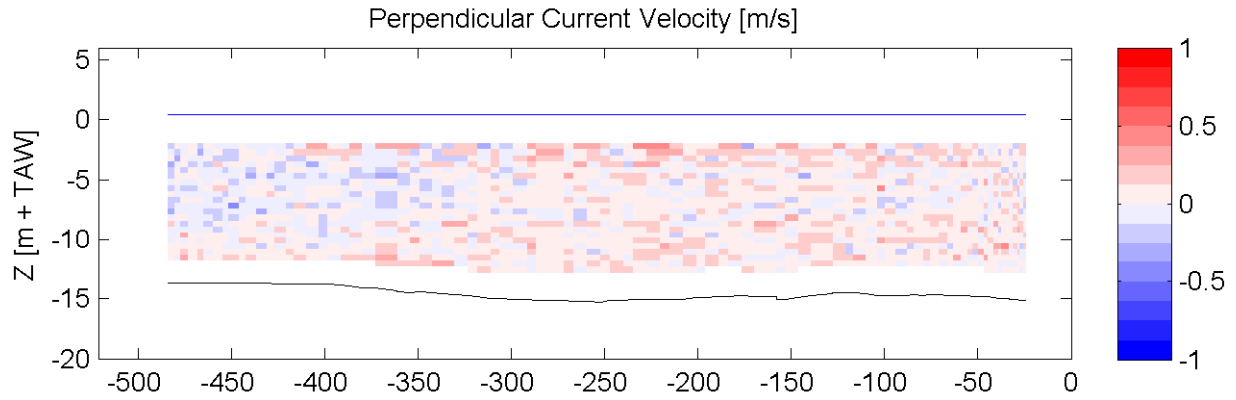
In association with : WL | delft hydraulics, GEMS International

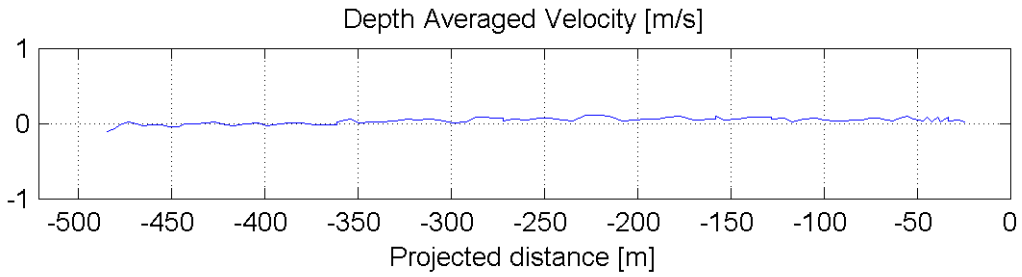
I/RA/11283/08.082/MSA

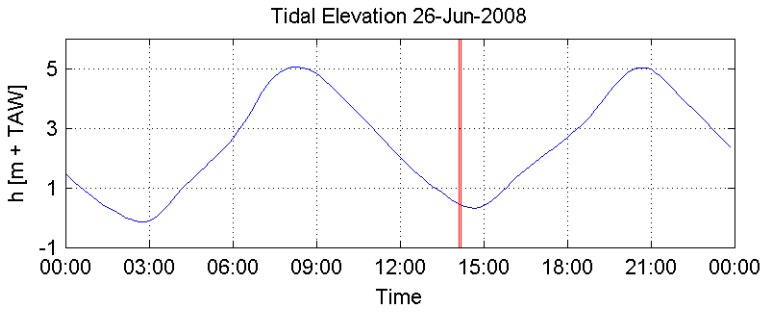
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6071DGDtrl_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

14:07 - 14:11

Time after HW [HH:MM]

5:49

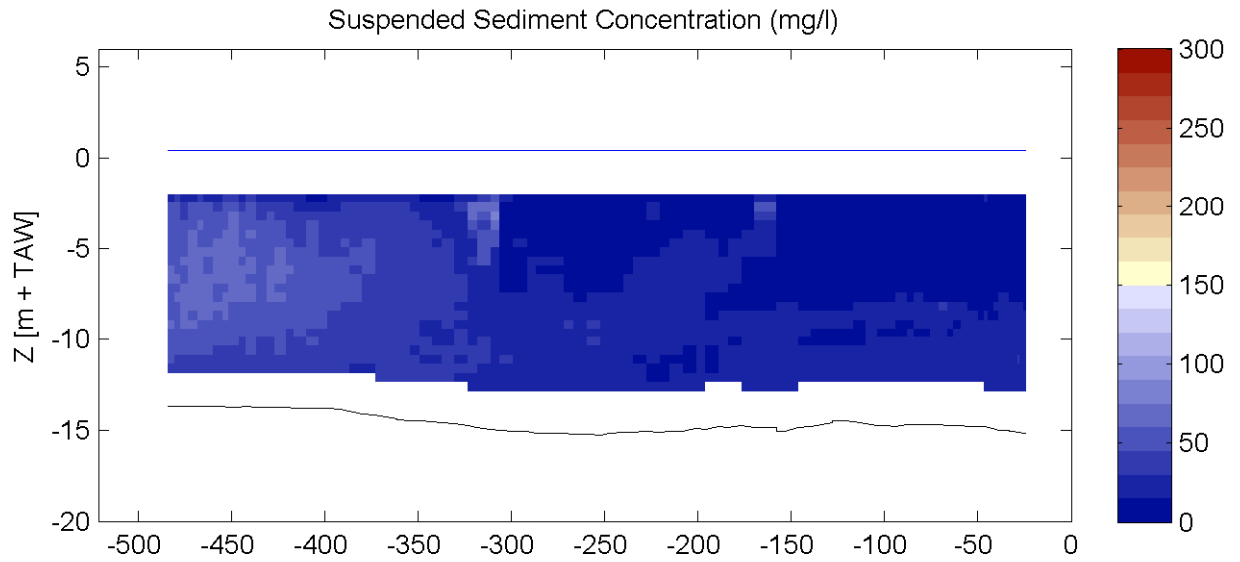
Data Processed by: IMDC

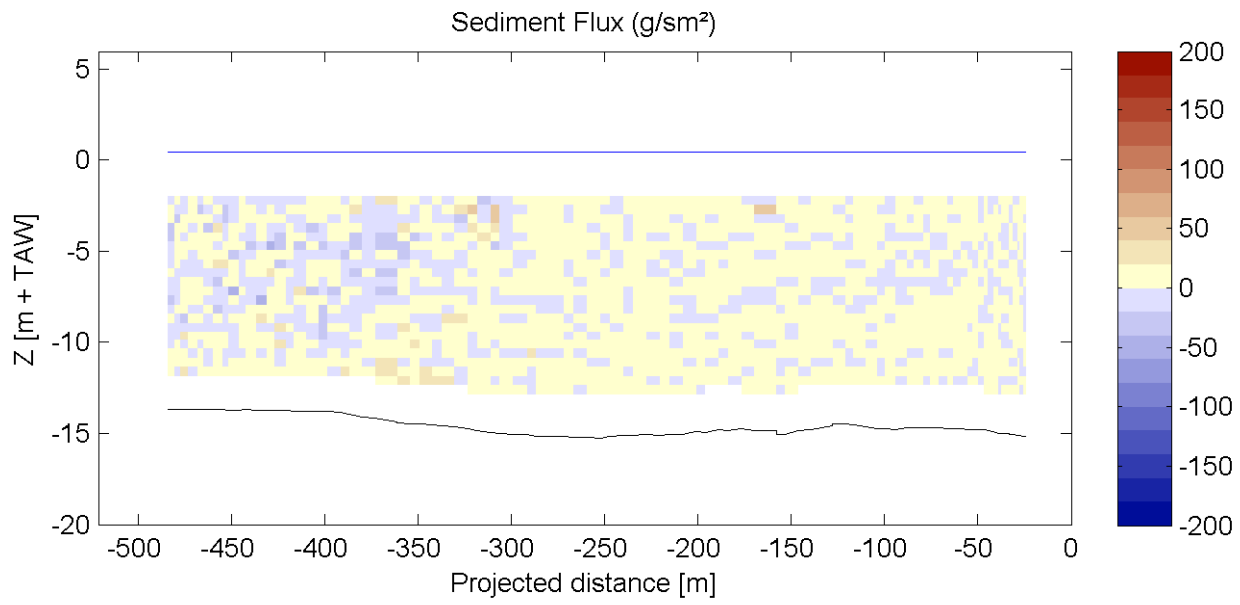
In association with : w.l | delft hydraulics GEMS

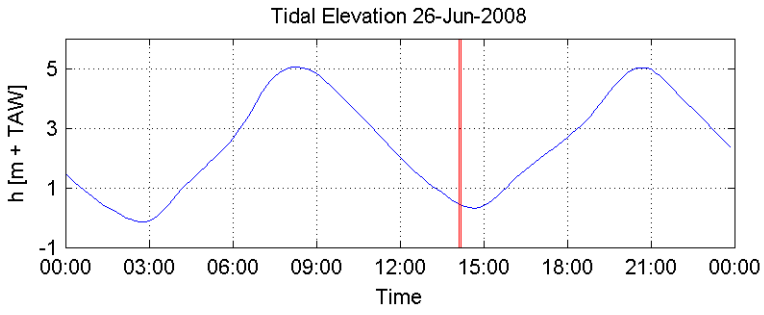
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6071DGDtrl_sub.csv	Location: Transect DGD







HW/LW: 08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

14:07 - 14:11

Time after HW [HH:MM]

5:49

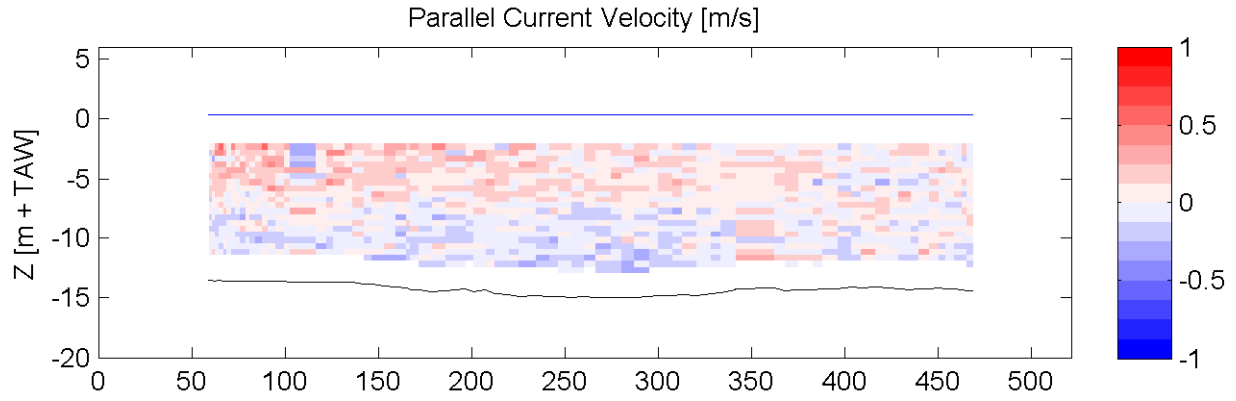
Data Processed by: IMDC

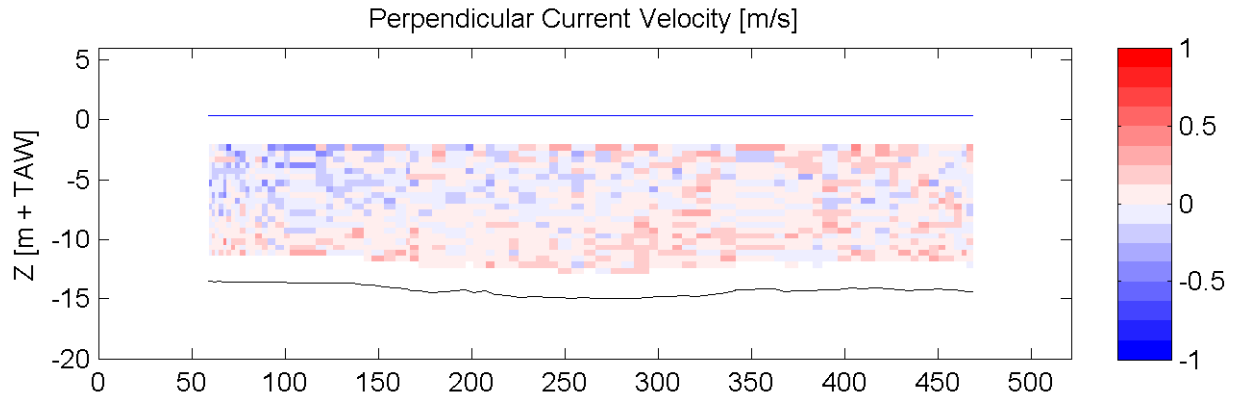
In association with : WL | delft hydraulics, GEMS International

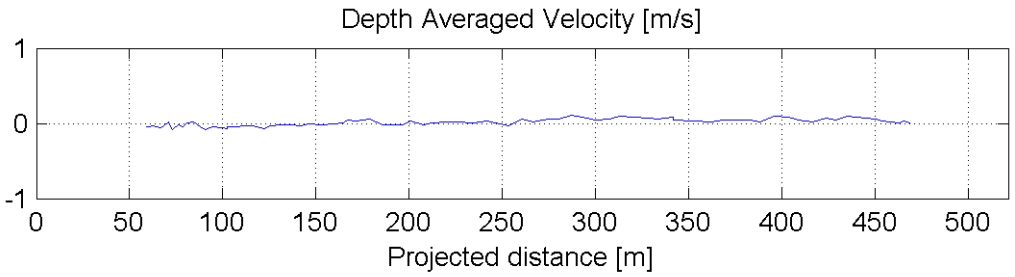
I/RA/11283/08.082/MSA

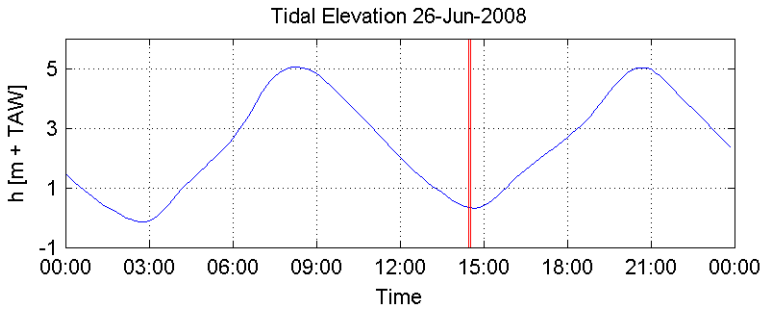
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6073DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

14:28 - 14:31

Time after HW [HH:MM]

6:10

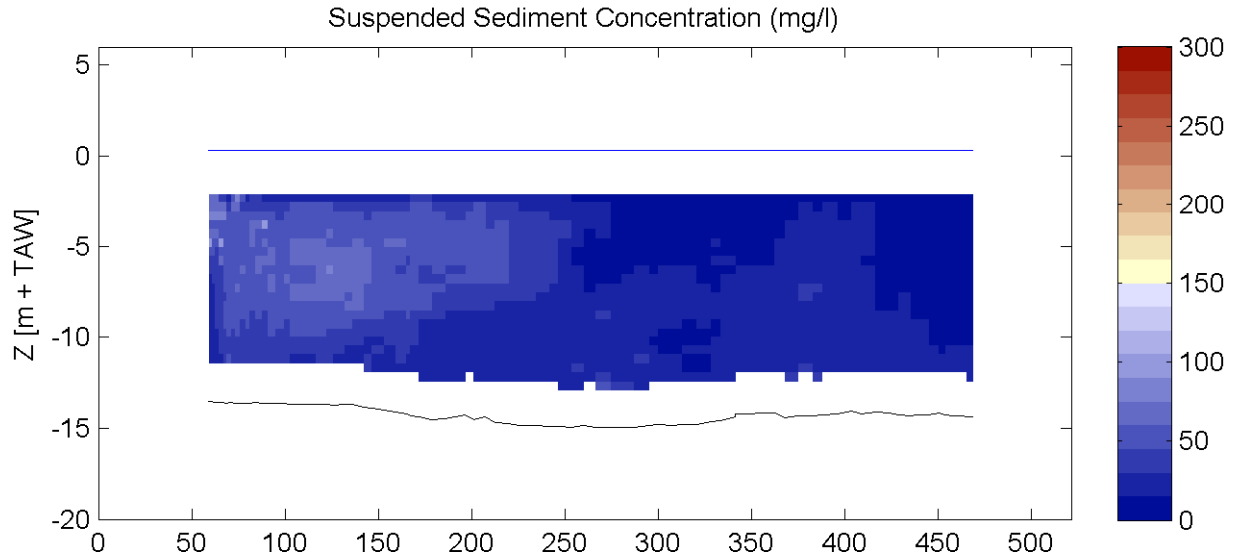
Data Processed by: IMDC

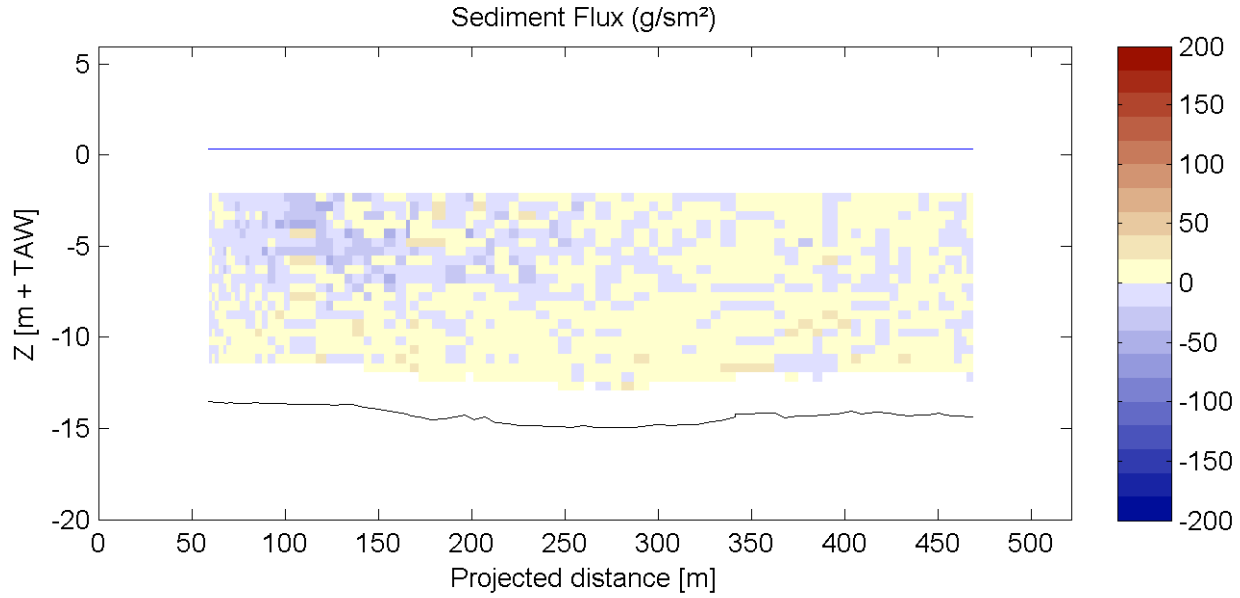
In association with : w.l | delft hydraulics, GEMS

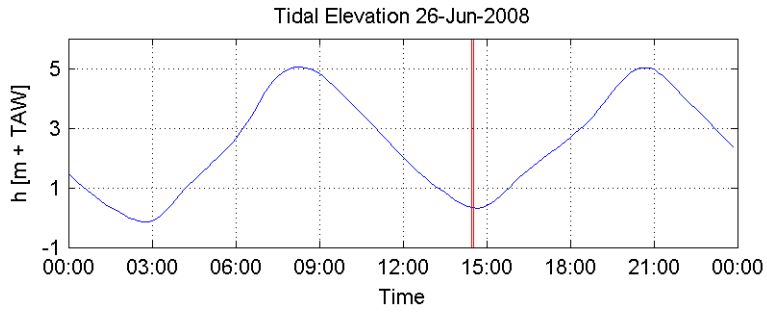
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6073DGDtlr_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

14:28 - 14:31

Time after HW [HH:MM]

6:10

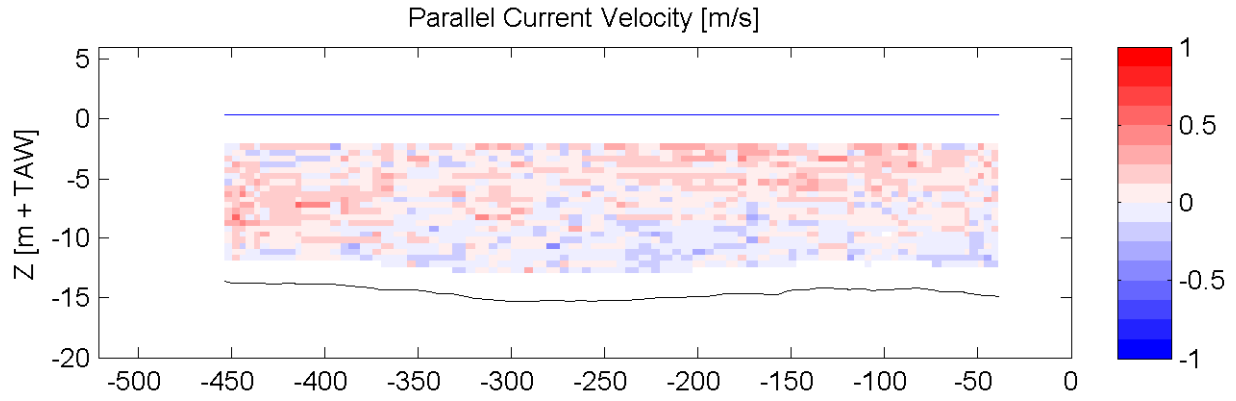
Data Processed by: IMDC

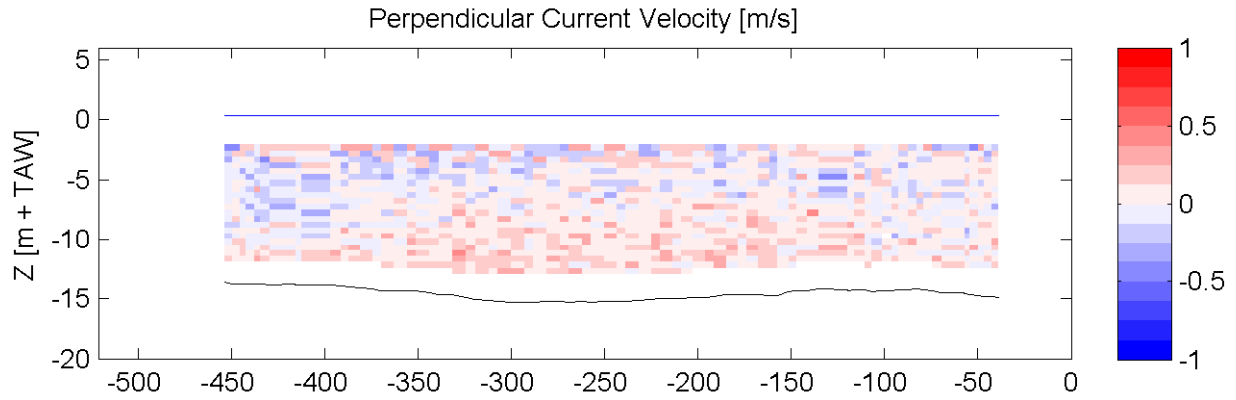
In association with : w.l | delft hydraulics GEMS

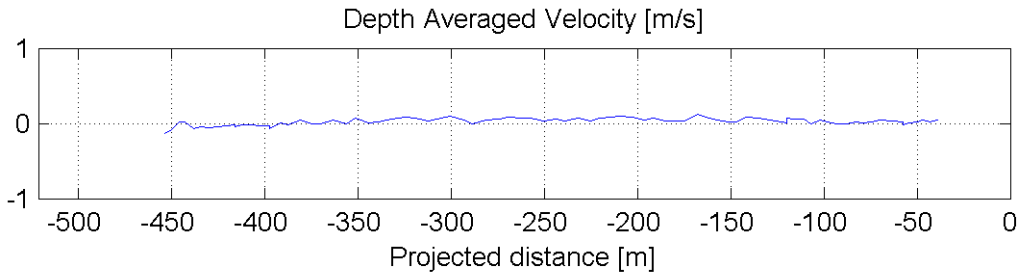
I/RA/11283/08.082/MSA

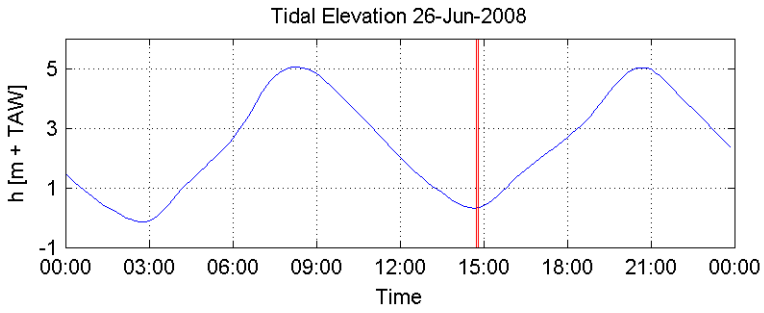
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6075DGDtrl_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

14:45 - 14:48

Time after HW [HH:MM]

-5:53

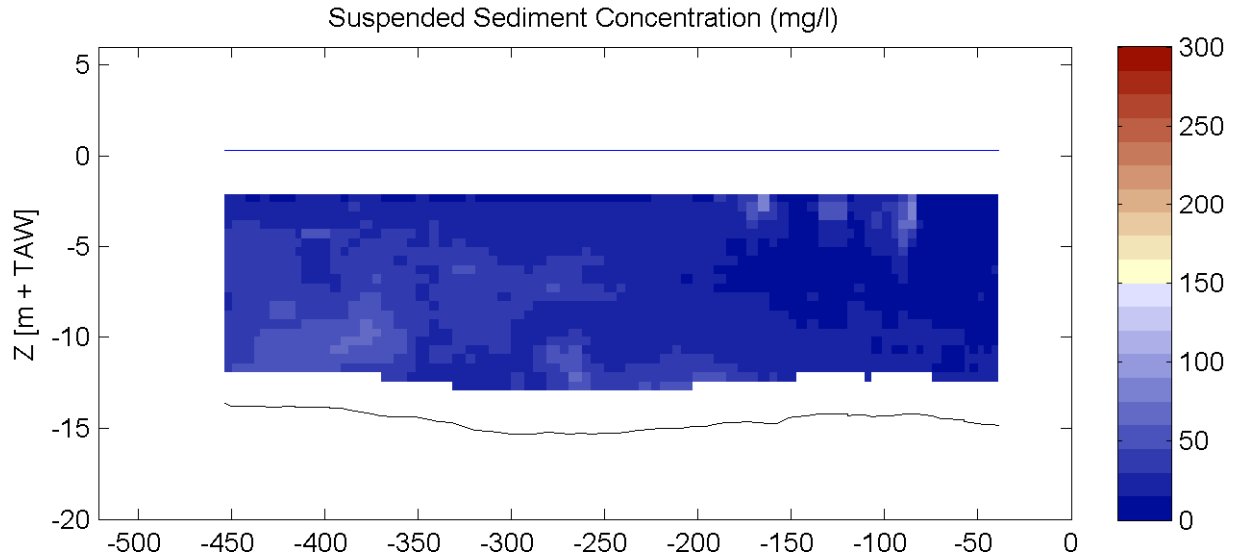
Data Processed by: IMDC

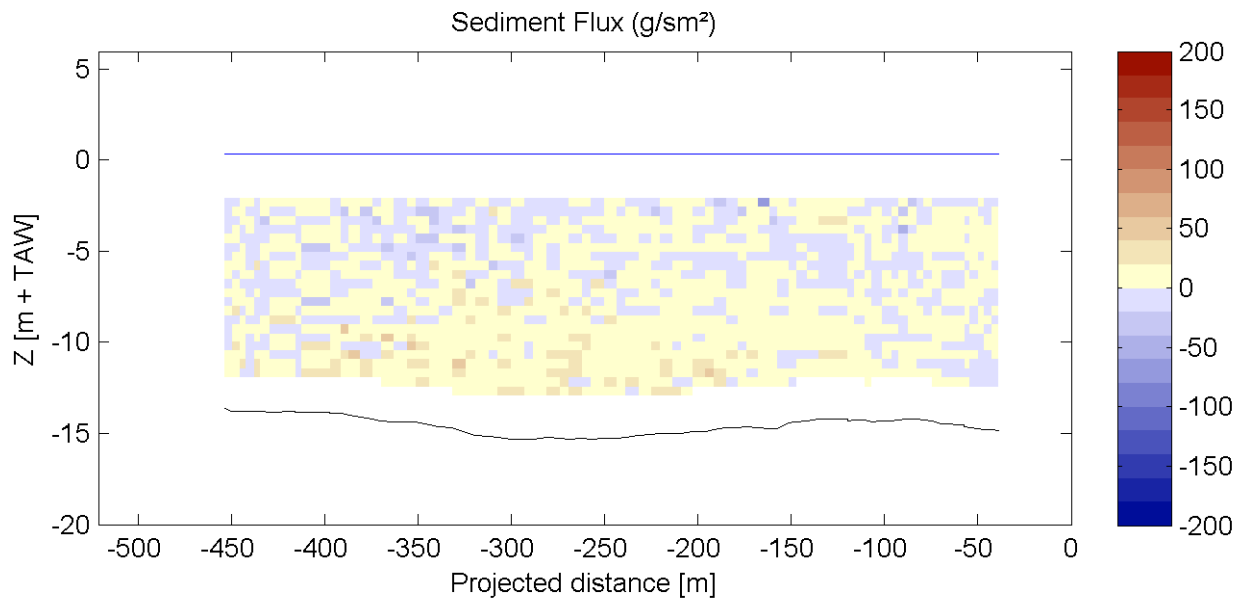
In association with : WL | delft hydraulics, GEMS International

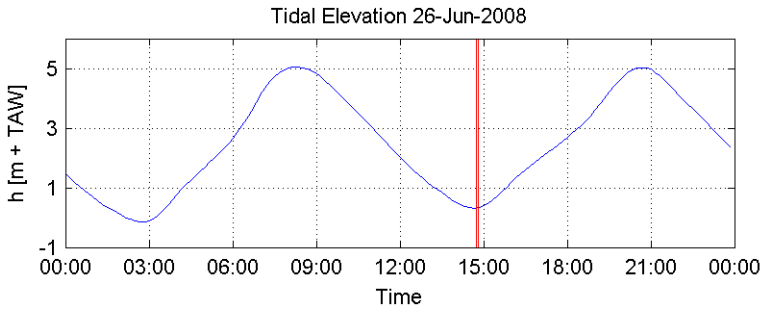
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6075DGDtrl_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

14:45 - 14:48

Time after HW [HH:MM]

-5:53

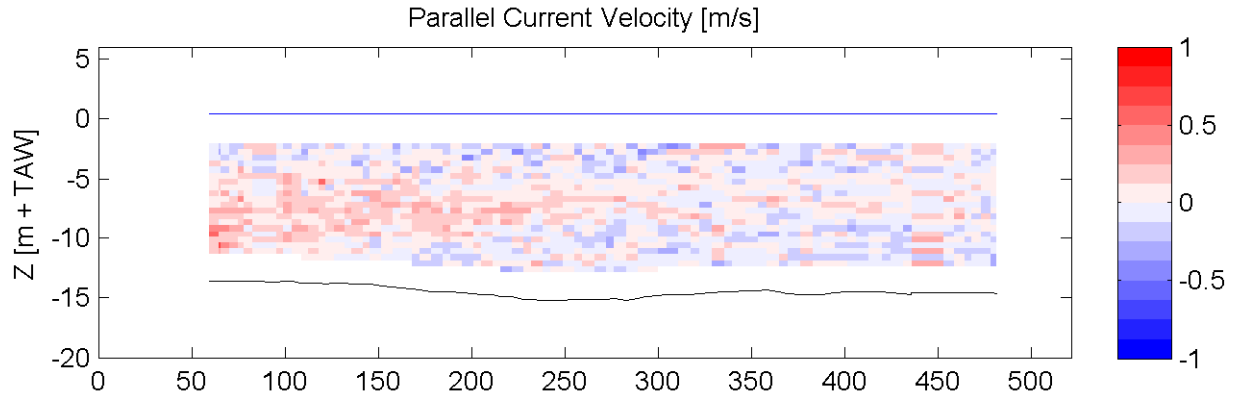
Data Processed by: IMDC

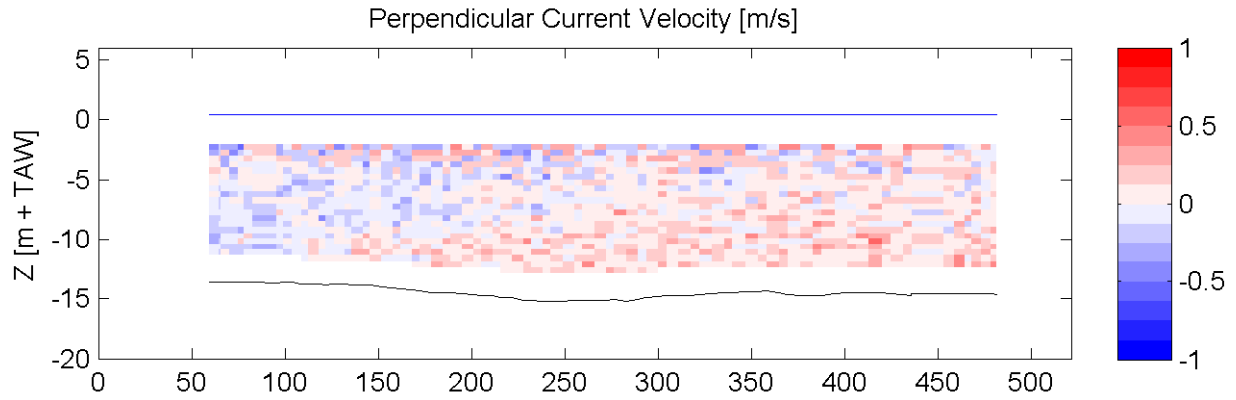
In association with : WL | delft hydraulics, GEMS International

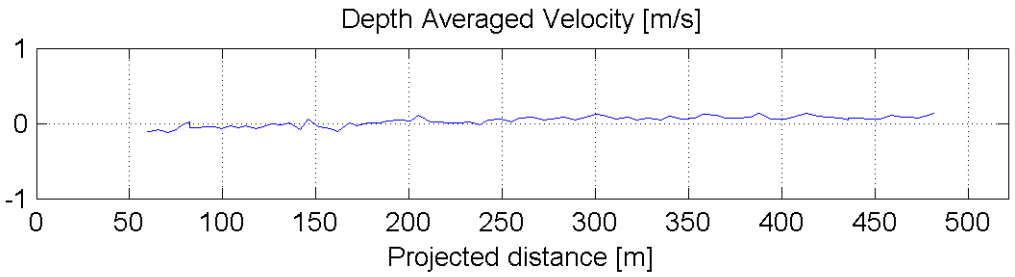
I/RA/11283/08.082/MSA

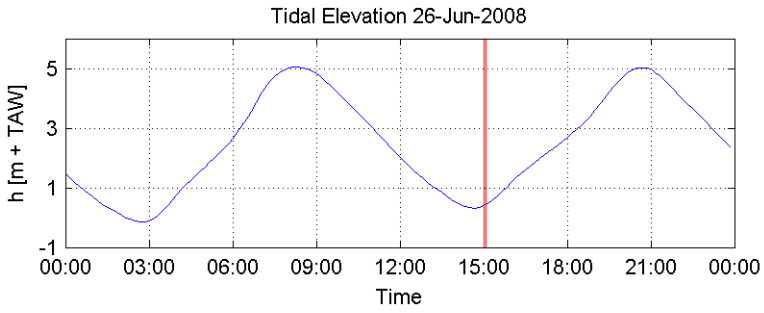
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6077DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

15:00 - 15:04

Time after HW [HH:MM]

-5:37

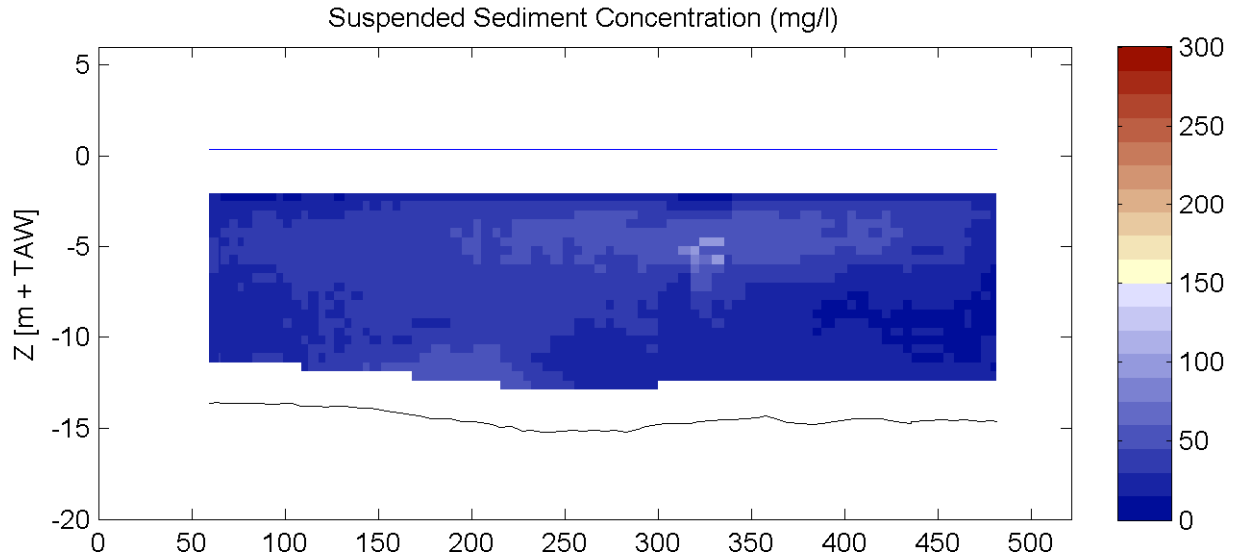
Data Processed by: IMDC

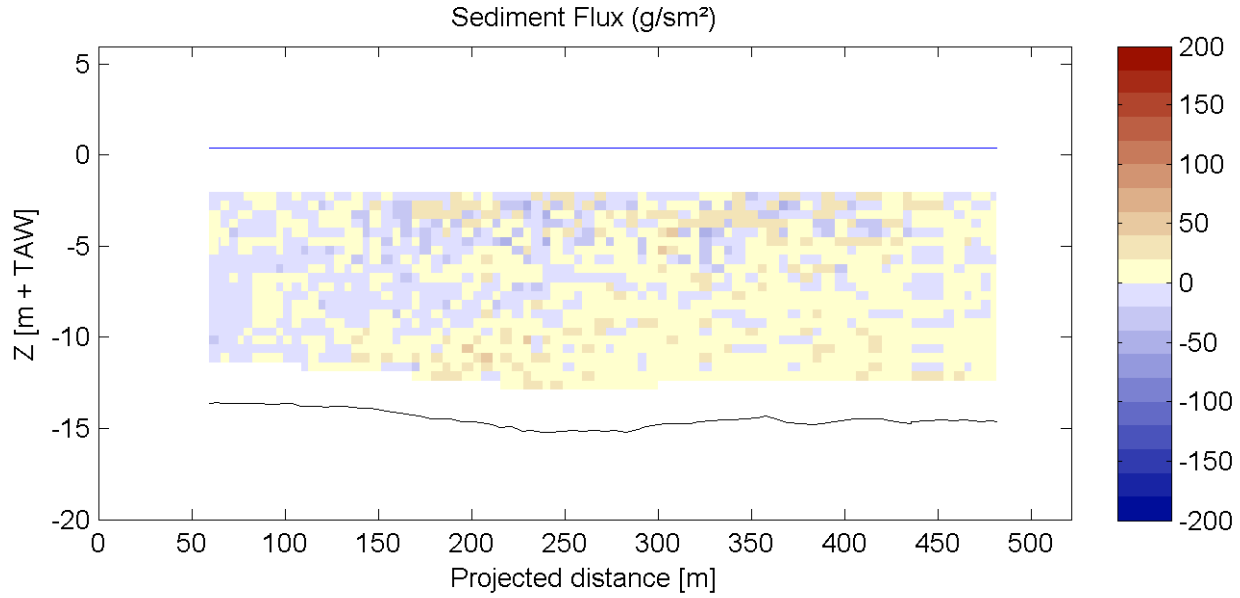
In association with : WL | delft hydraulics, GEMS International

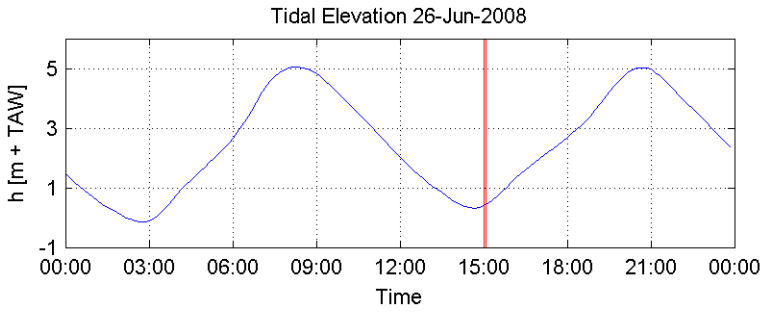
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6077DGDtlr_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

15:00 - 15:04

Time after HW [HH:MM]

-5:37

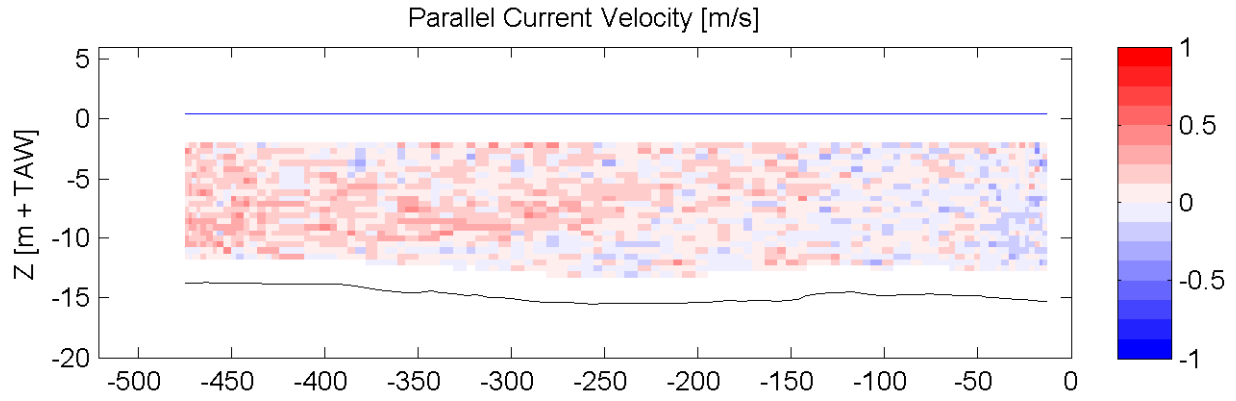
Data Processed by: IMDC

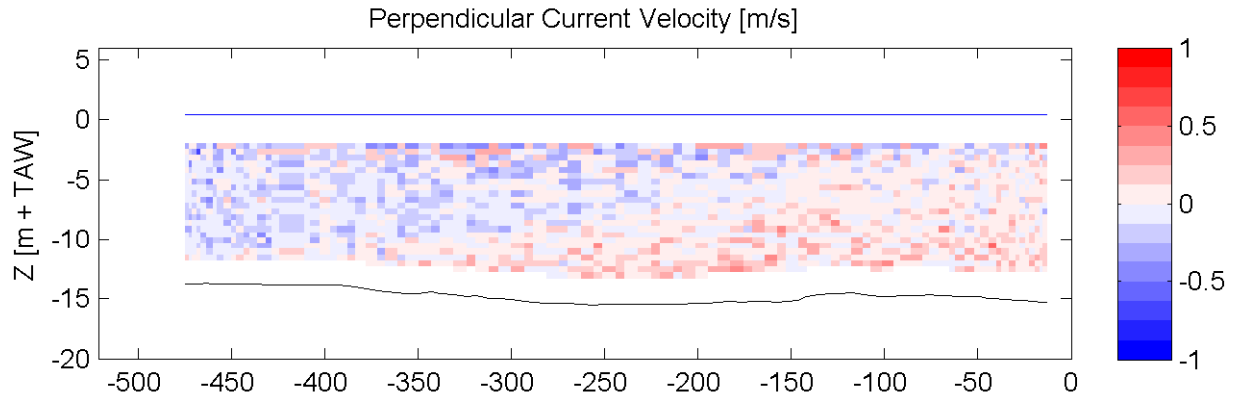
In association with : WL | delft hydraulics, GEMS International

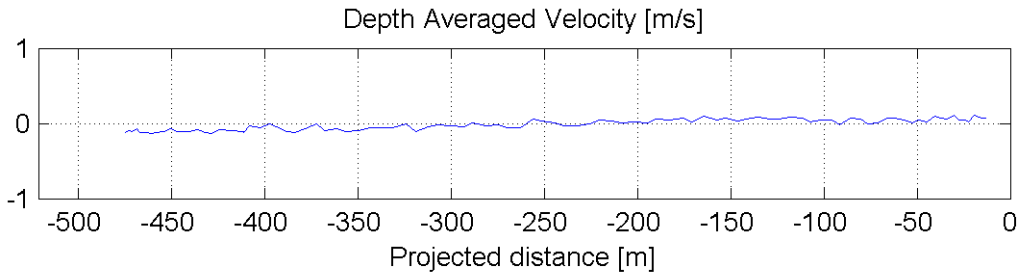
I/RA/11283/08.082/MSA

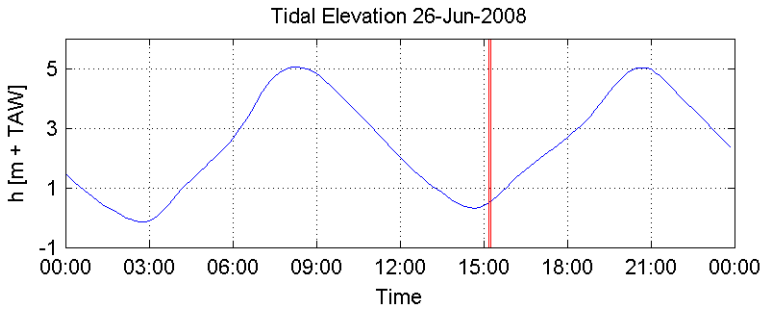
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6079DGDtrl.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

15:11 - 15:15

Time after HW [HH:MM]

-5:26

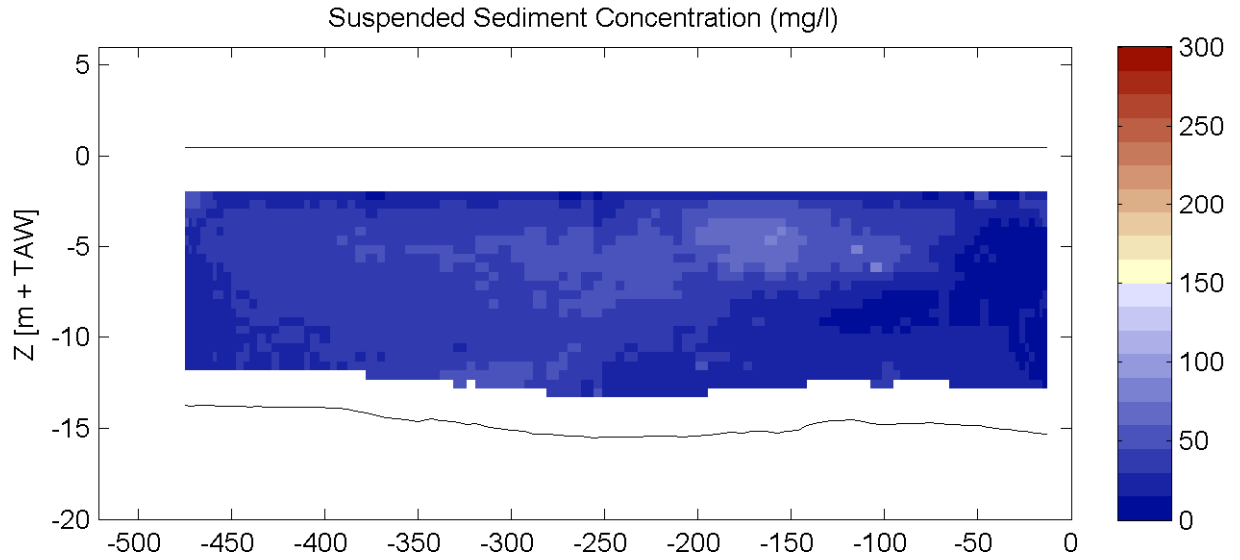
Data Processed by: IMDC

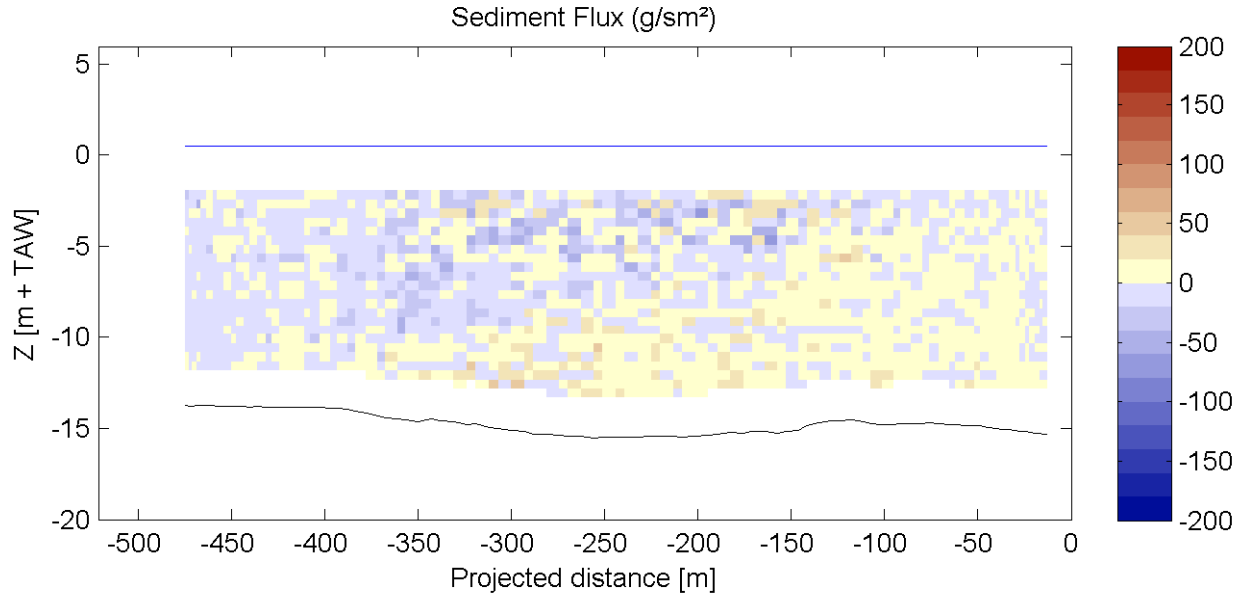
In association with : GEMS

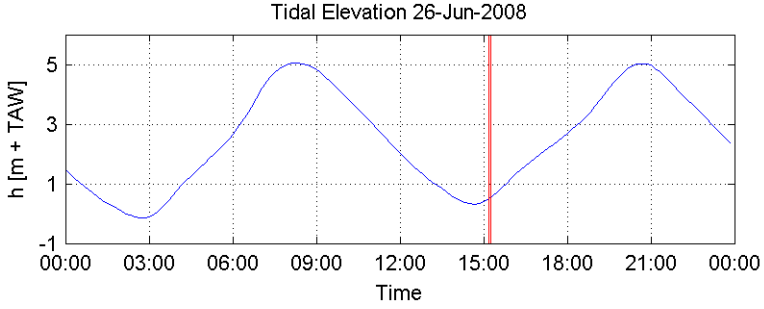
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6079DGDtrl.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

15:11 - 15:15

Time after HW [HH:MM]

-5:26

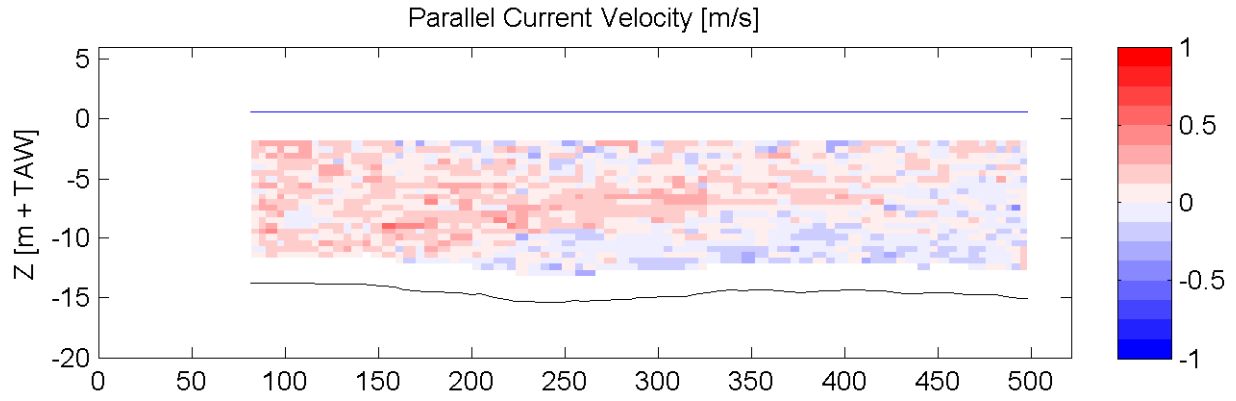
Data Processed by: IMDC

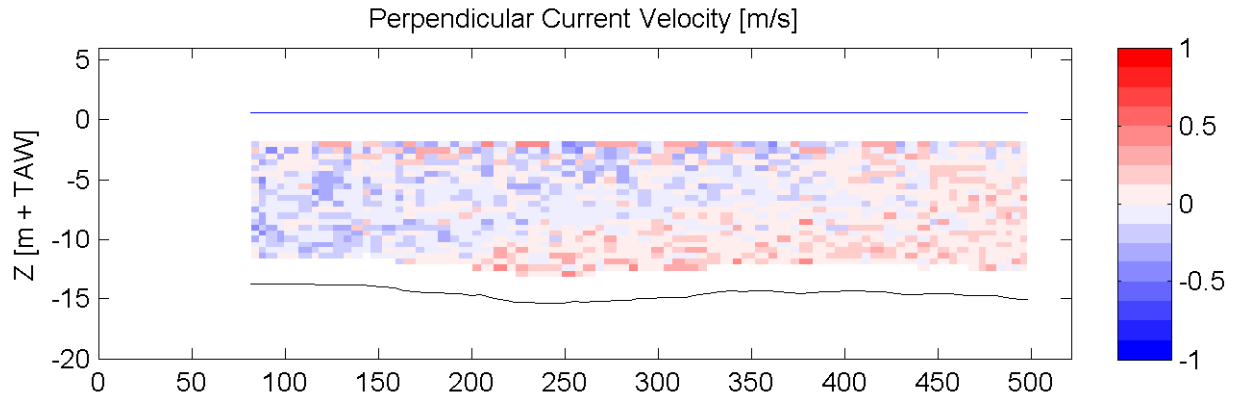
In association with : w.l | delft hydraulics, GEMS

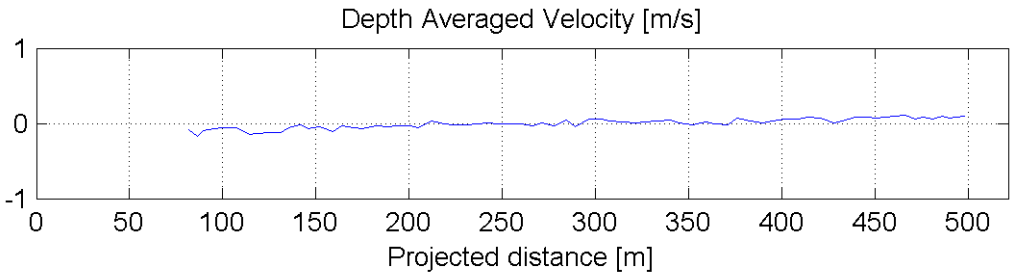
I/RA/11283/08.082/MSA

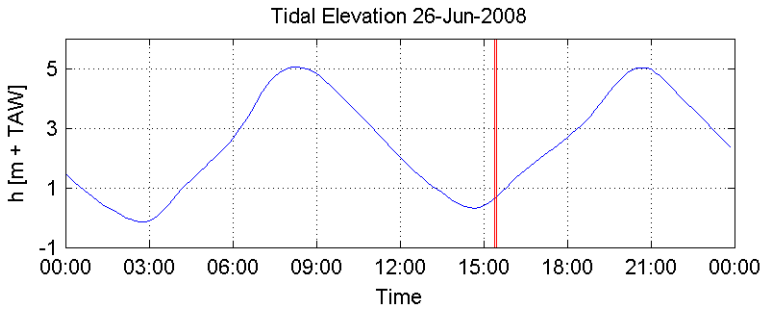
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6081DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

15:24 - 15:27

Time after HW [HH:MM]

-5:13

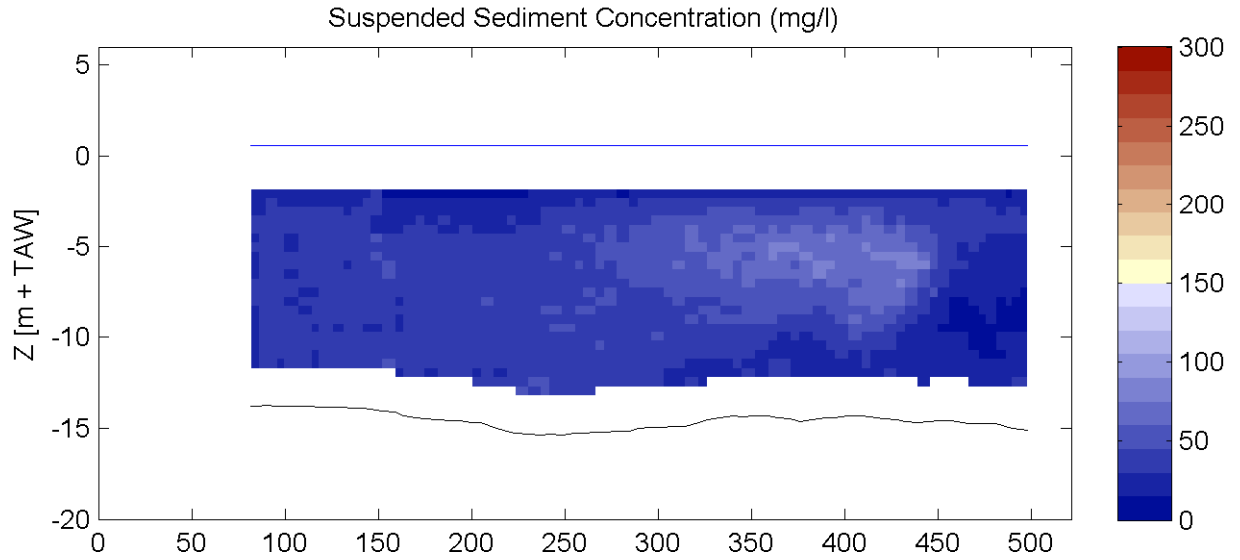
Data Processed by: IMDC

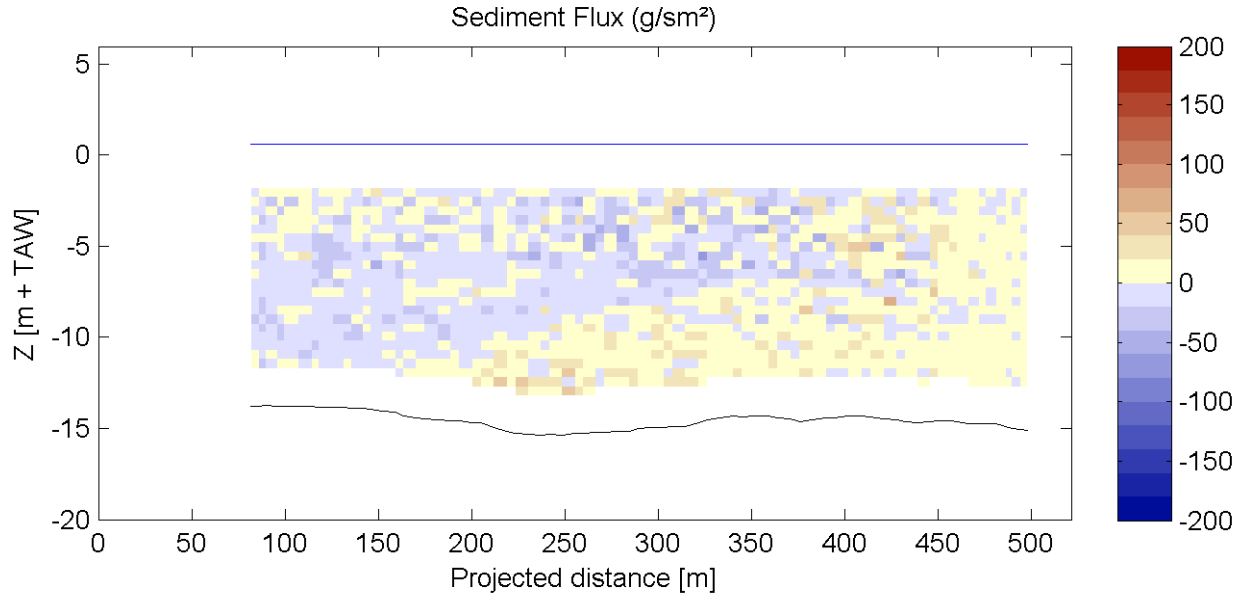
In association with : w.l | delft hydraulics, GEMS International

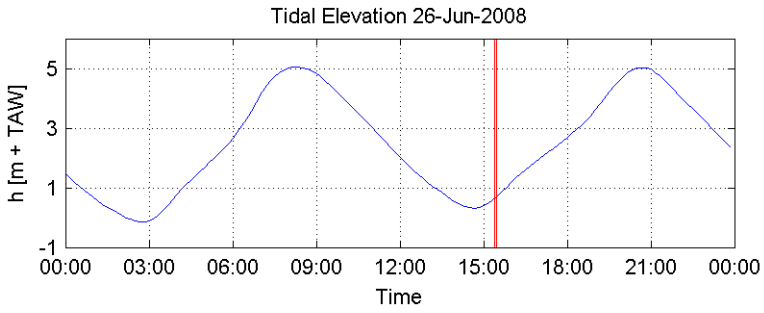
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6081DGDtlr_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

15:24 - 15:27

Time after HW [HH:MM]

-5:13

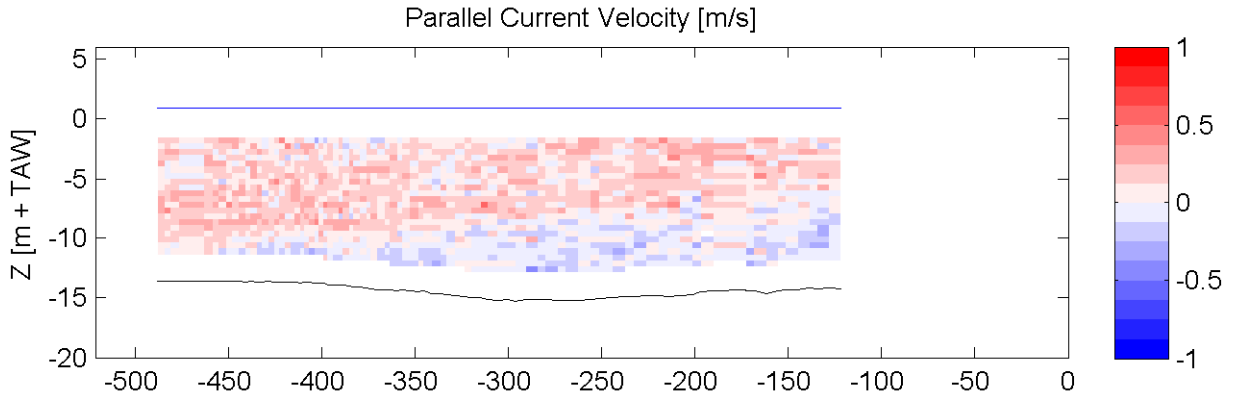
Data Processed by: IMDC

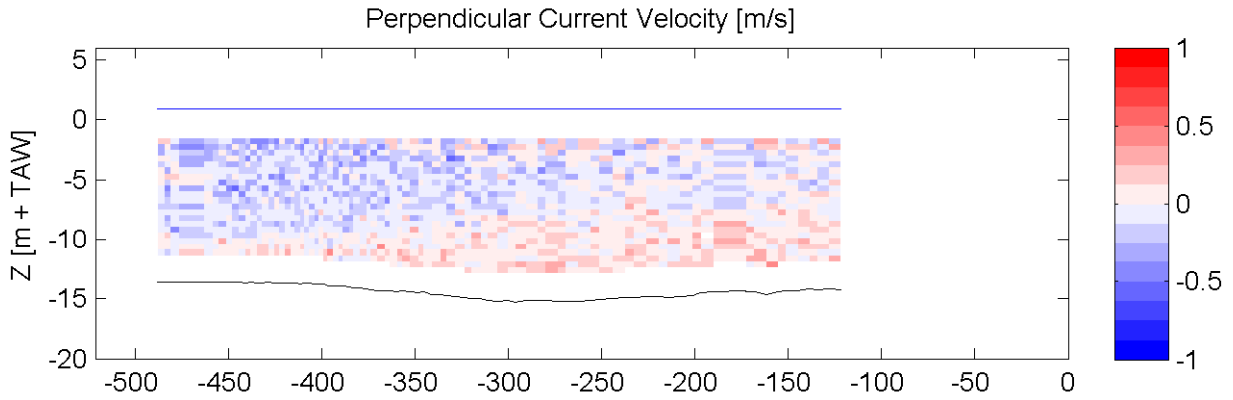
In association with : WL | delft hydraulics, GEMS International

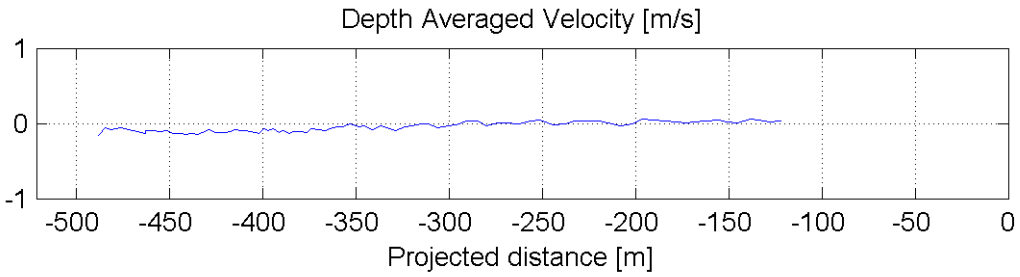
I/RA/11283/08.082/MSA

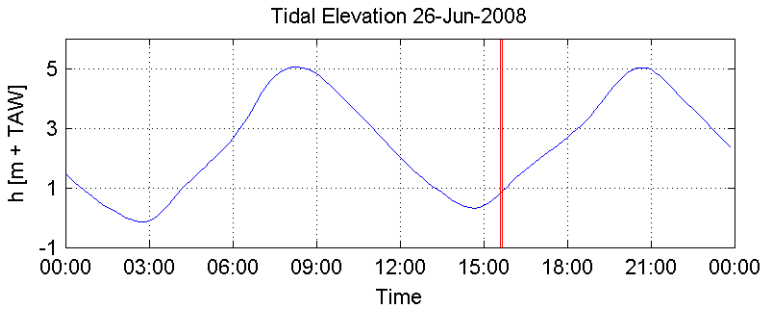
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6083DGDtrl.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

15:35 - 15:39

Time after HW [HH:MM]

-5:02

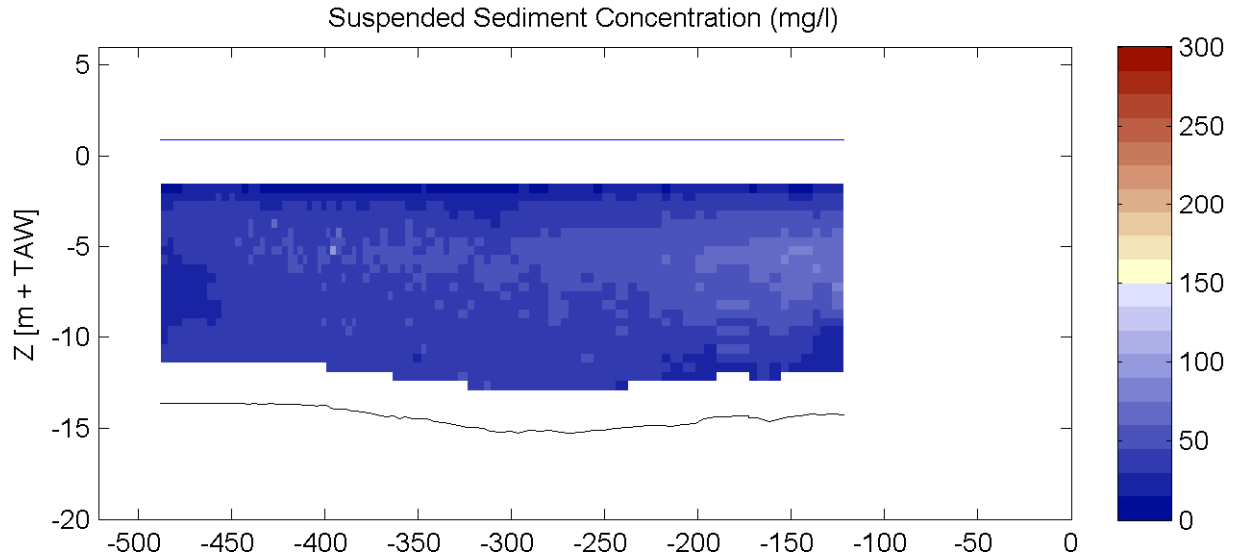
Data Processed by: IMDC

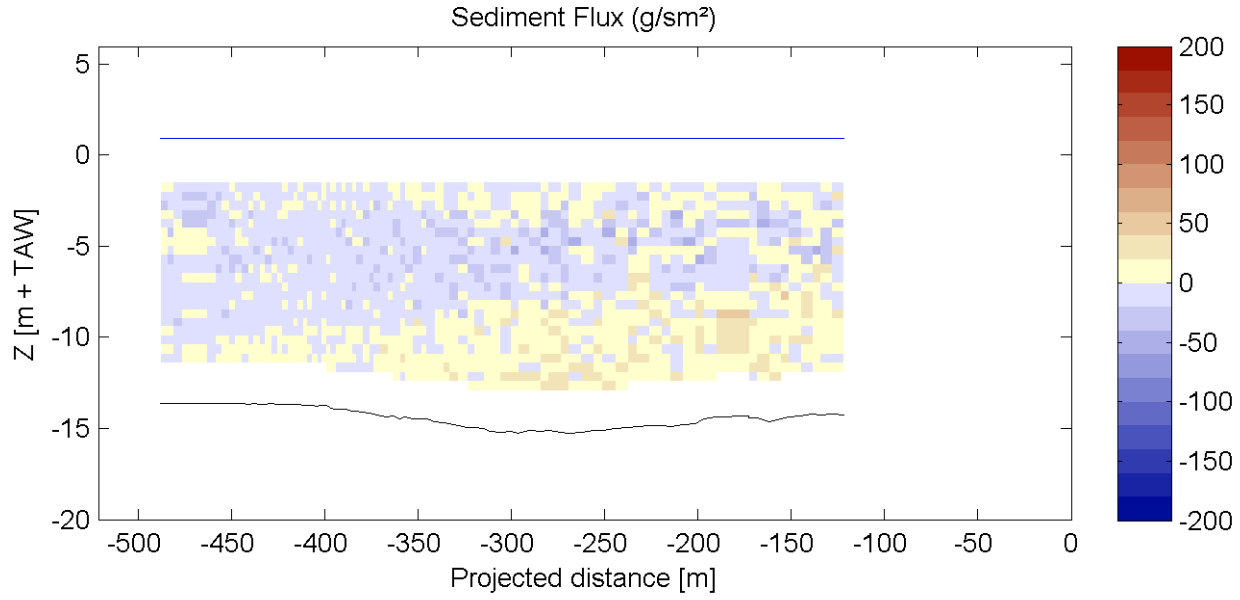
In association with : w.l | delft hydraulics, GEMS

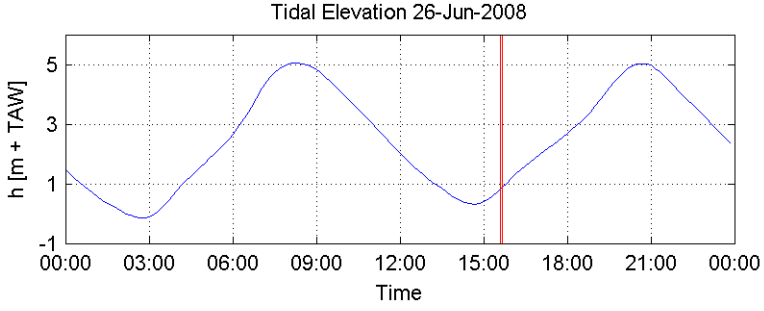
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6083DGDtrl.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

15:35 - 15:39

Time after HW [HH:MM]

-5:02

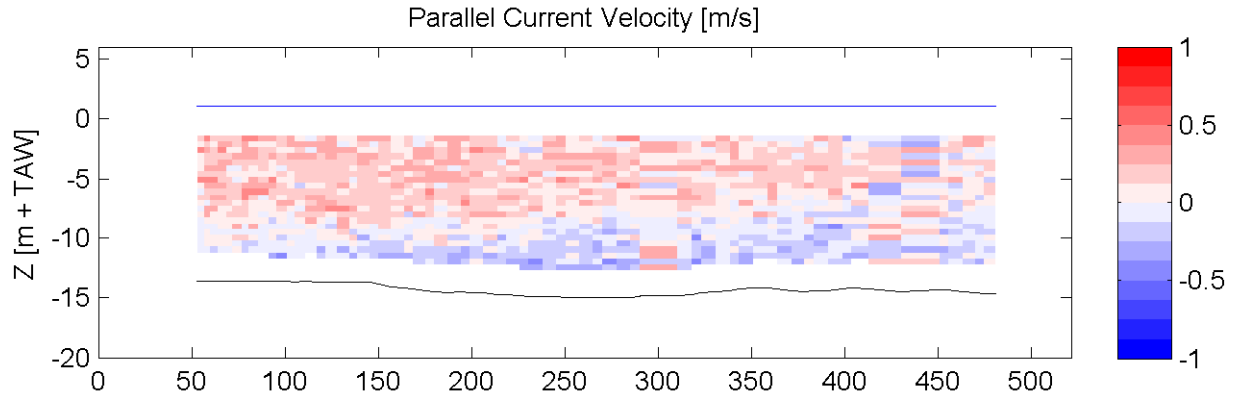
Data Processed by: IMDC

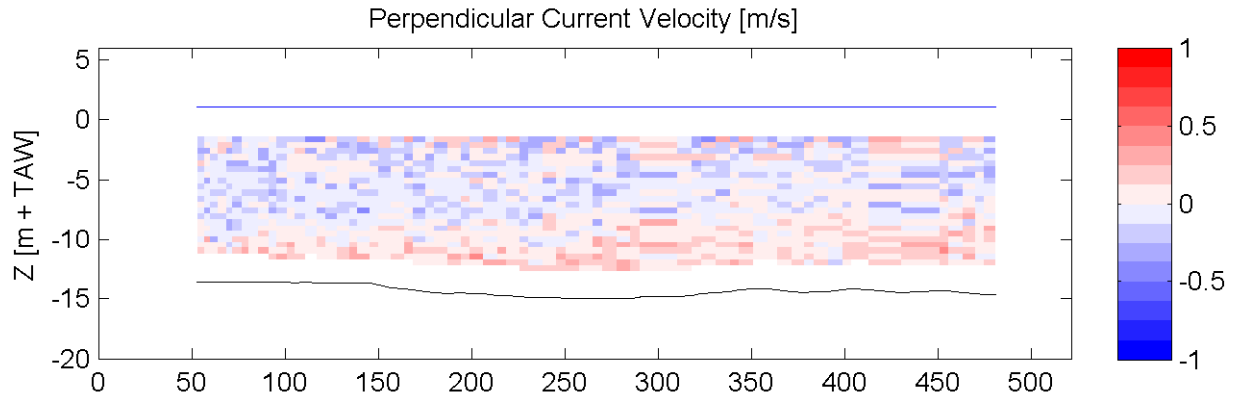
In association with : WL | delft hydraulics, GEMS International

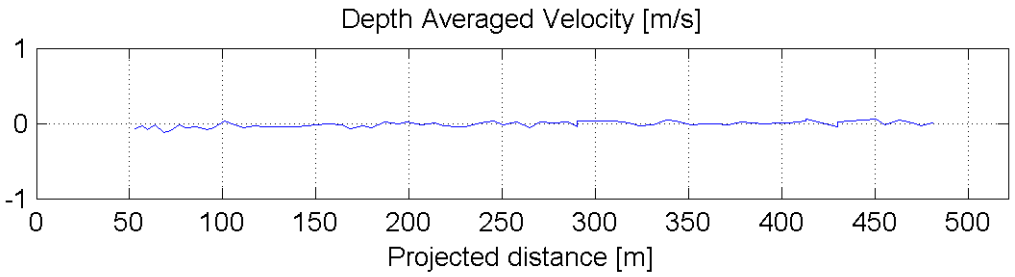
I/RA/11283/08.082/MSA

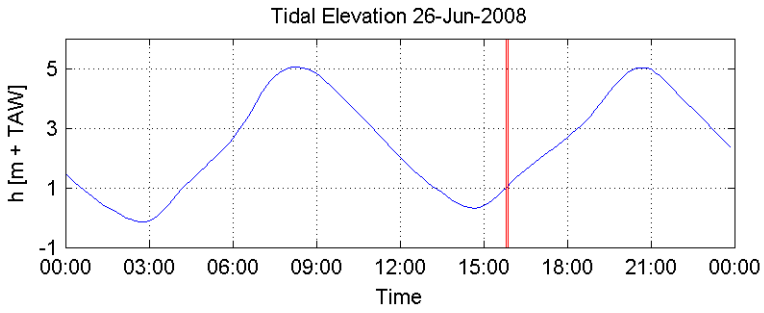
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6085DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

15:49 - 15:52

Time after HW [HH:MM]

-4:49

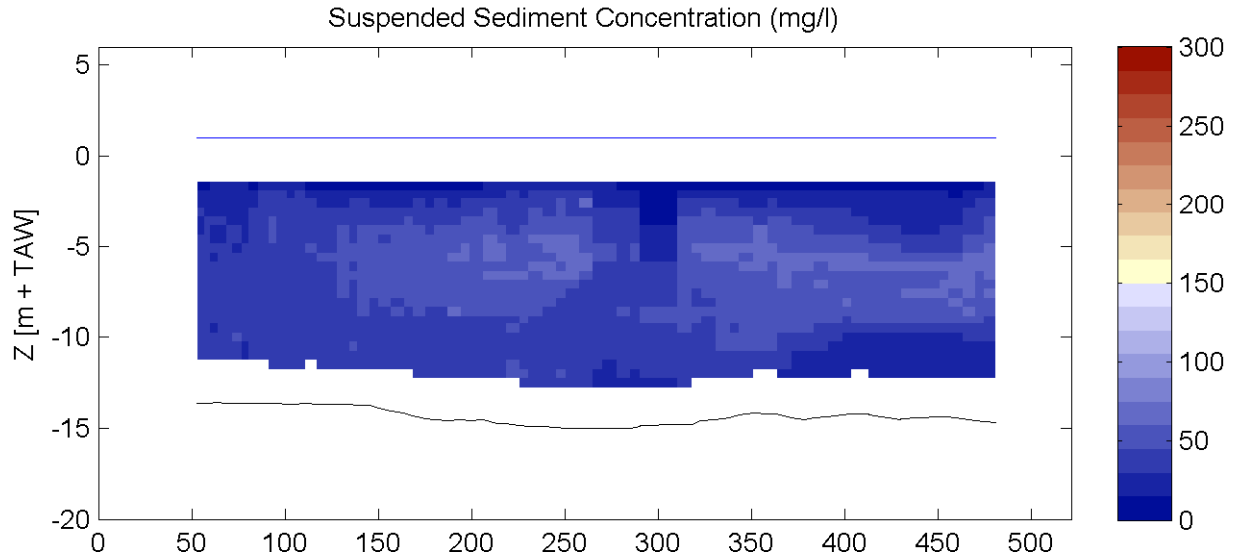
Data Processed by: IMDC

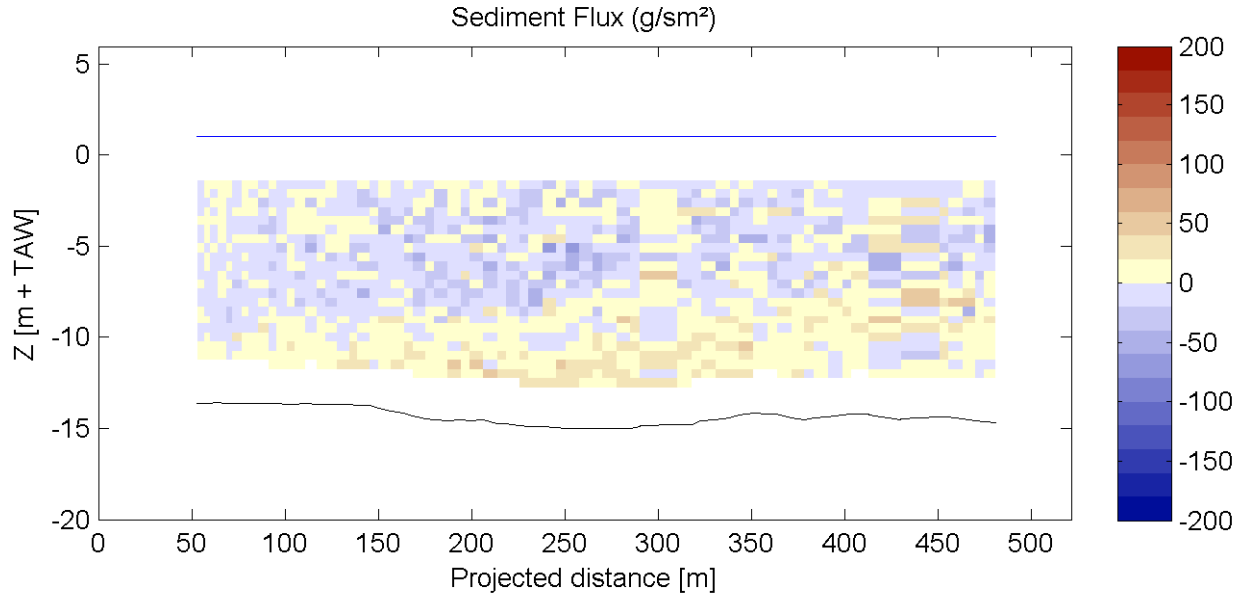
In association with : w.l | delft hydraulics, GEMS

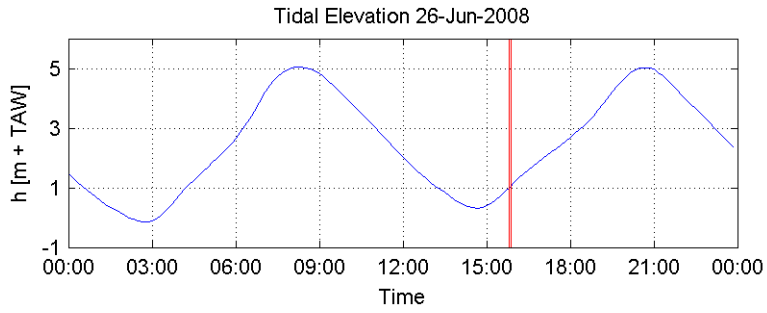
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6085DGDtlr_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

15:49 - 15:52

Time after HW [HH:MM]

-4:49

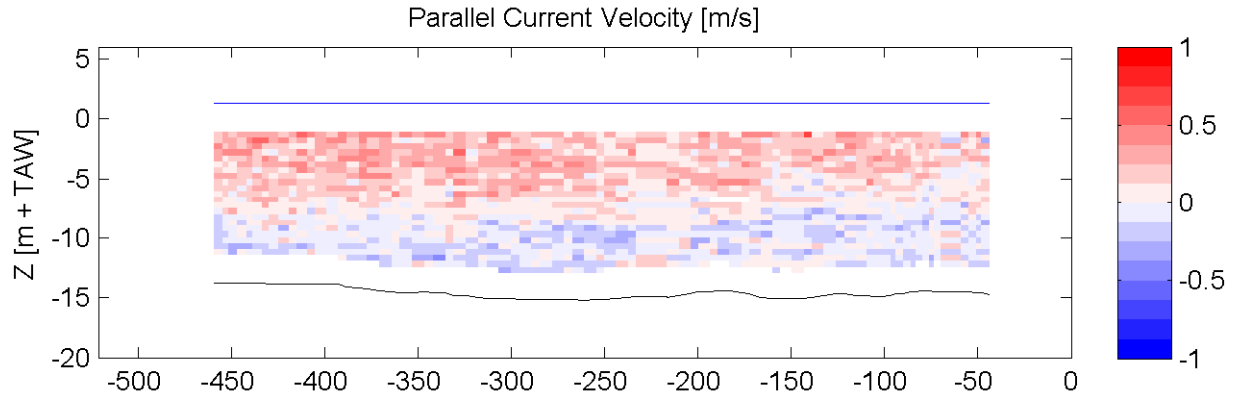
Data Processed by: IMDC

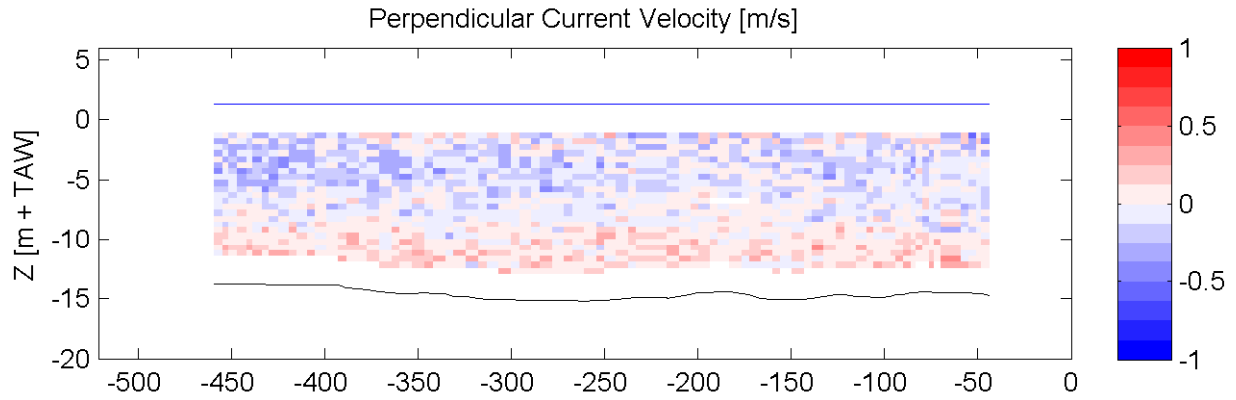
In association with : WL | delft hydraulics, GEMS International

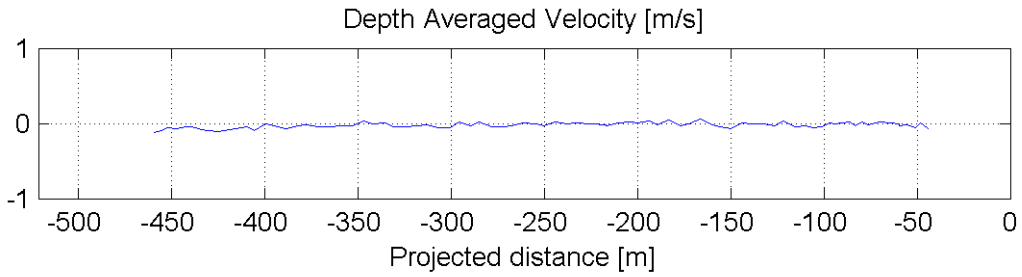
I/RA/11283/08.082/MSA

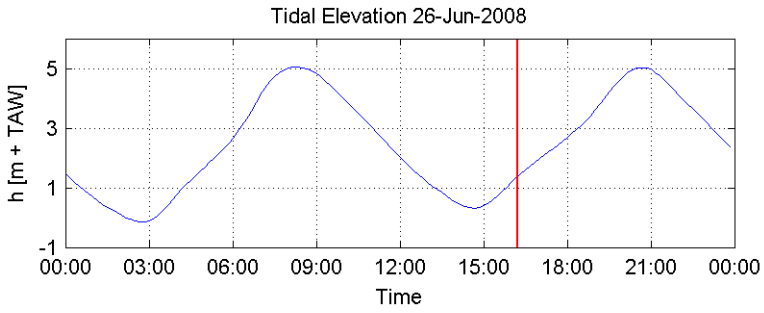
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6087DGDtrl_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

16:10 - 16:14

Time after HW [HH:MM]

-4:27

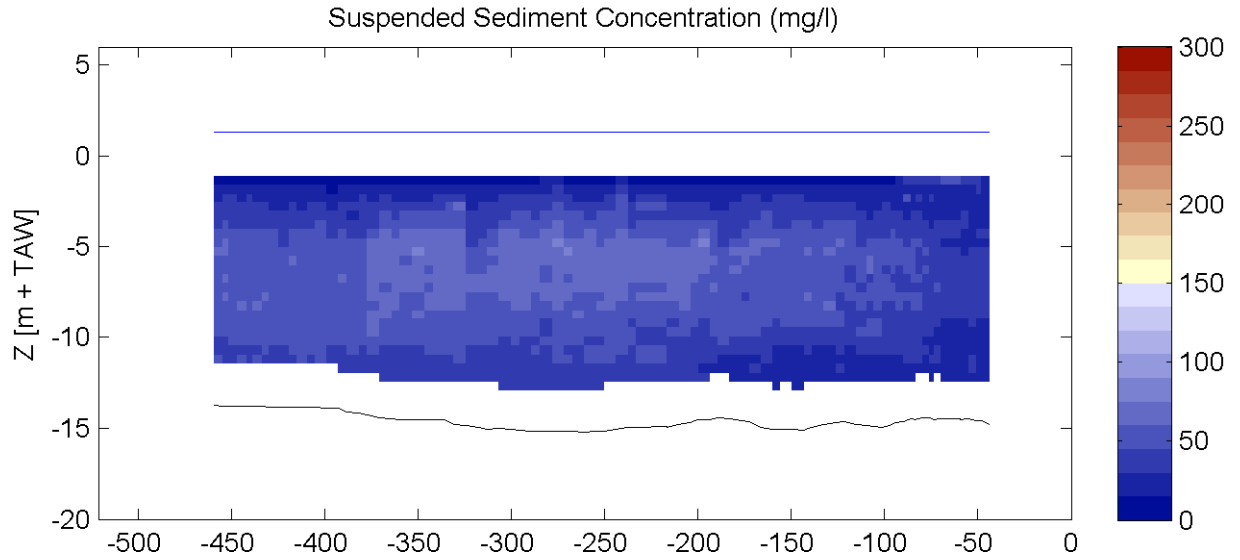
Data Processed by: IMDC

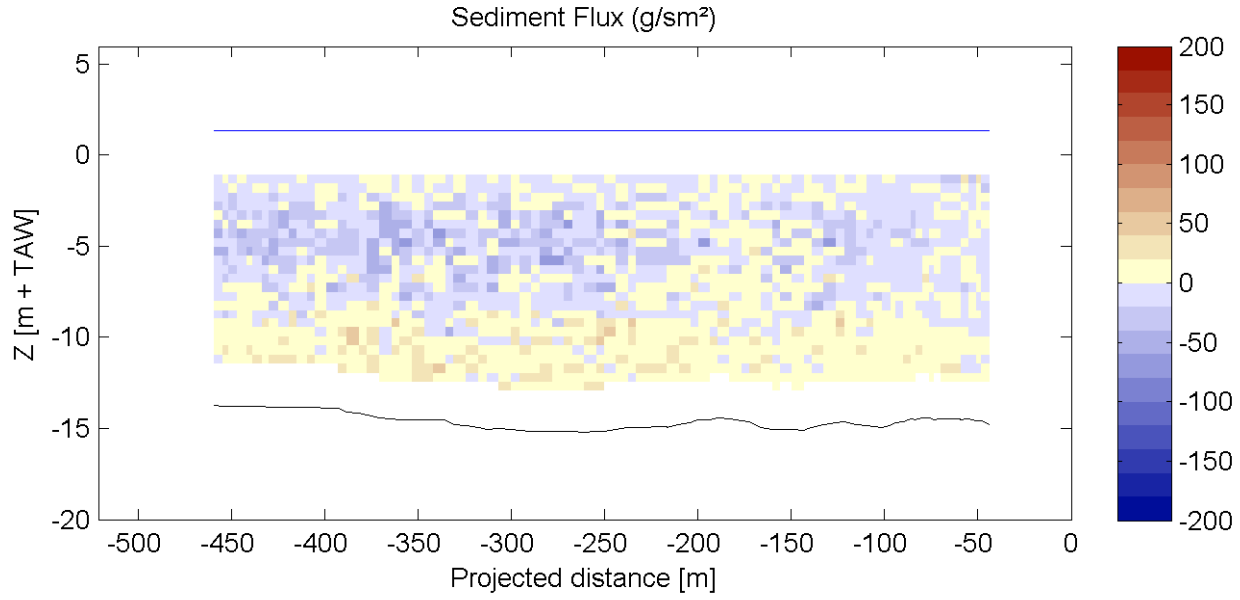
In association with : w.l | delft hydraulics, GEMS

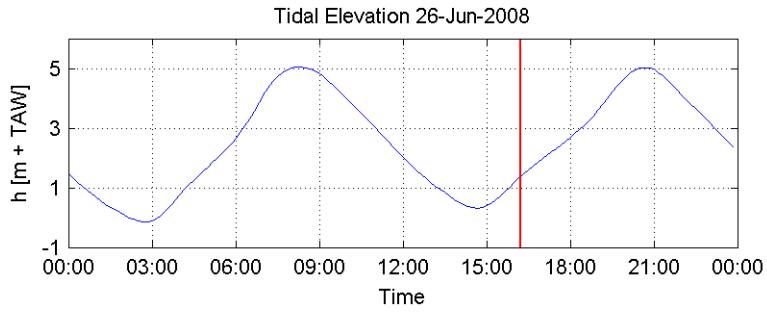
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6087DGDtrl_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

16:10 - 16:14

Time after HW [HH:MM]

-4:27

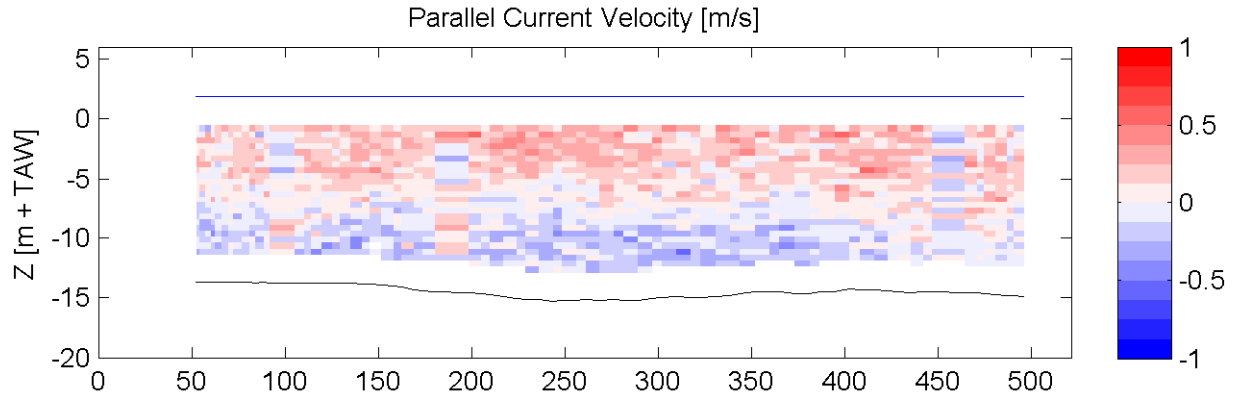
Data Processed by: IMDC

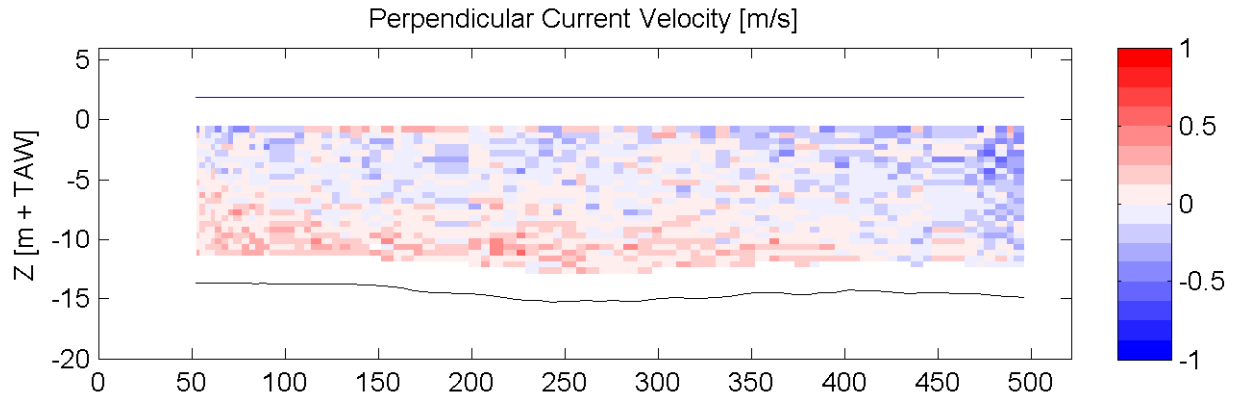
In association with : WL | delft hydraulics, GEMS International

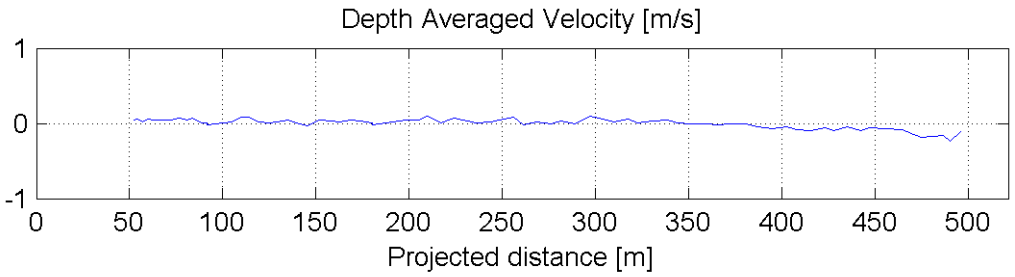
I/RA/11283/08.082/MSA

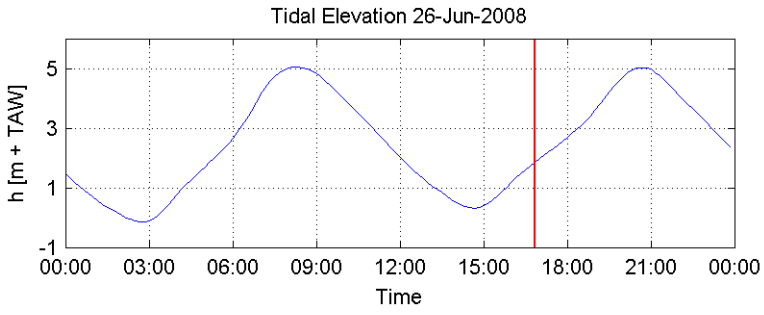
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6089DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

16:48 - 16:51

Time after HW [HH:MM]

-3:50

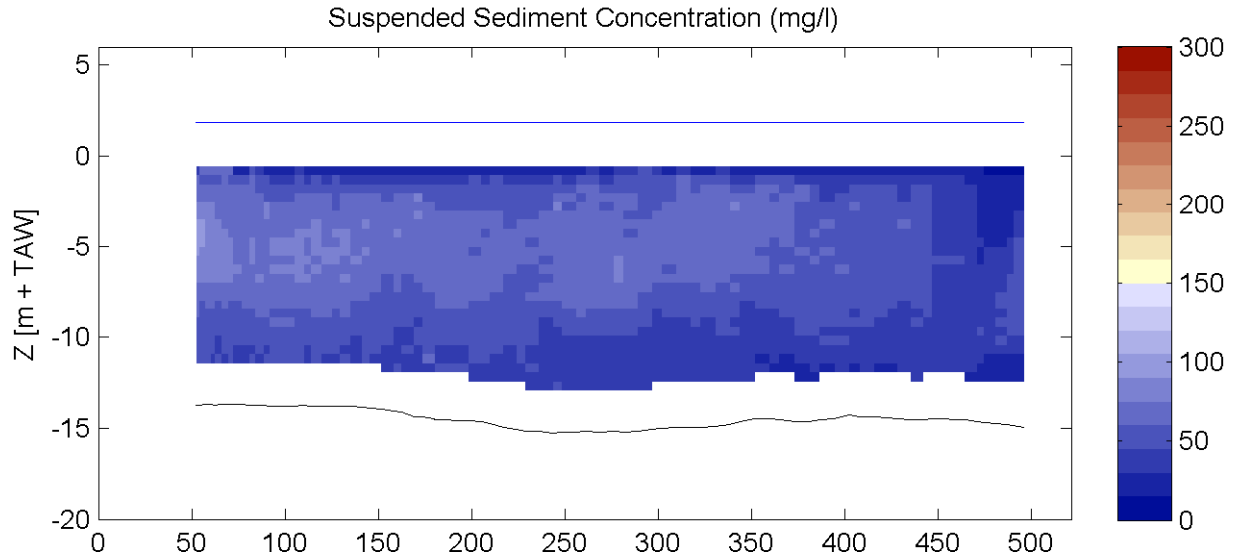
Data Processed by: IMDC

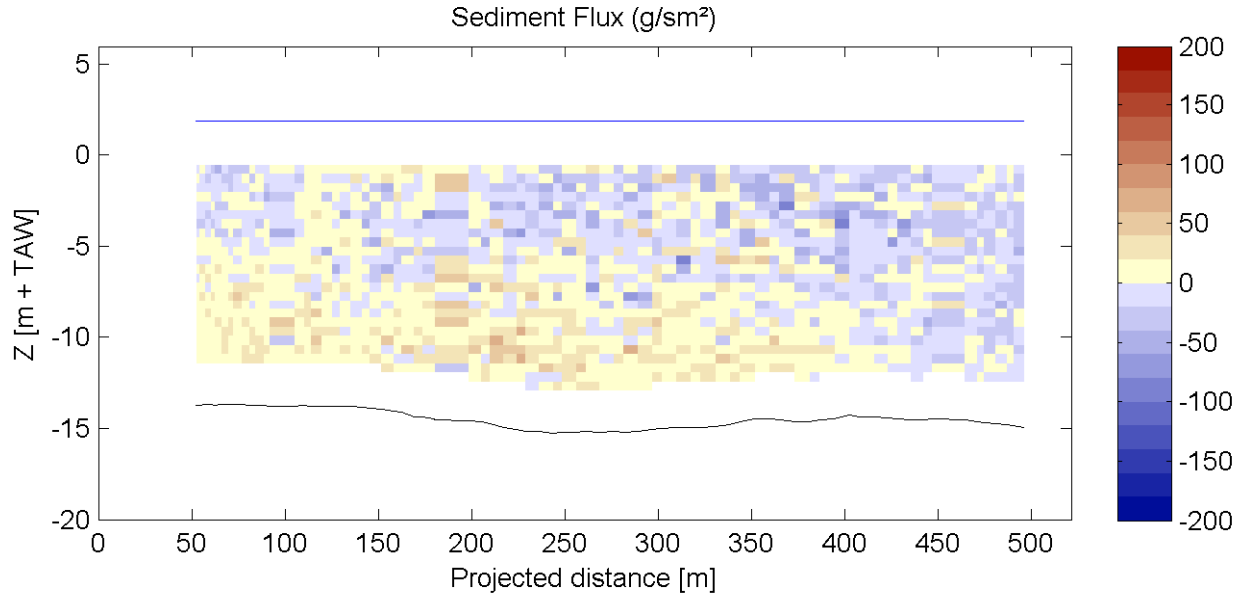
In association with : w.l | delft hydraulics, GEMS

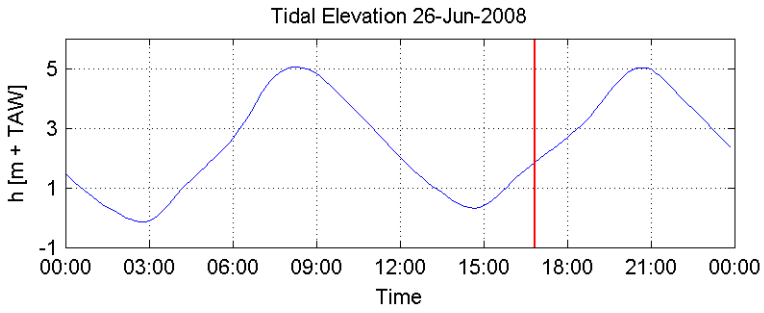
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6089DGDtlr_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

16:48 - 16:51

Time after HW [HH:MM]

-3:50

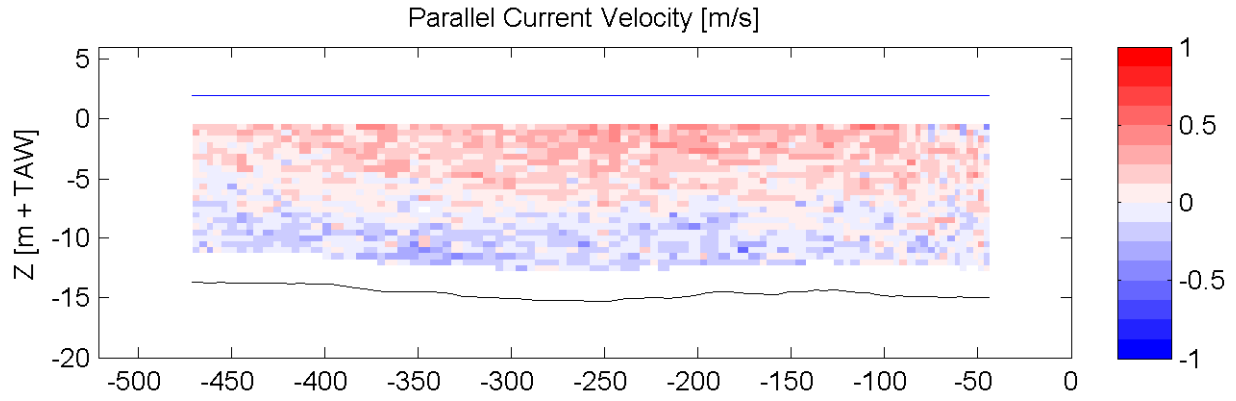
Data Processed by: IMDC

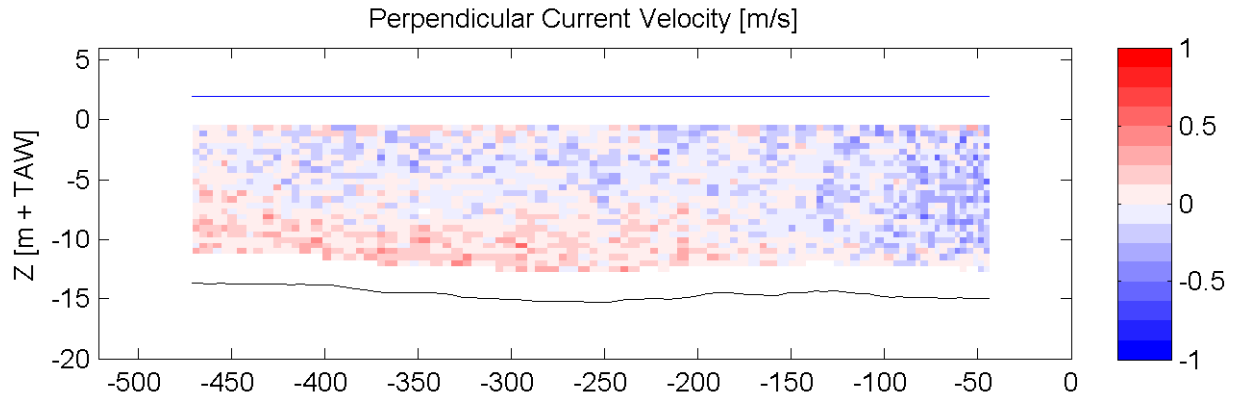
In association with : WL | delft hydraulics, GEMS International

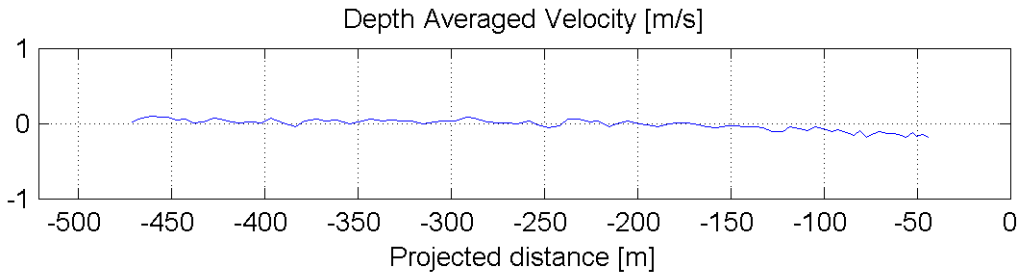
I/RA/11283/08.082/MSA

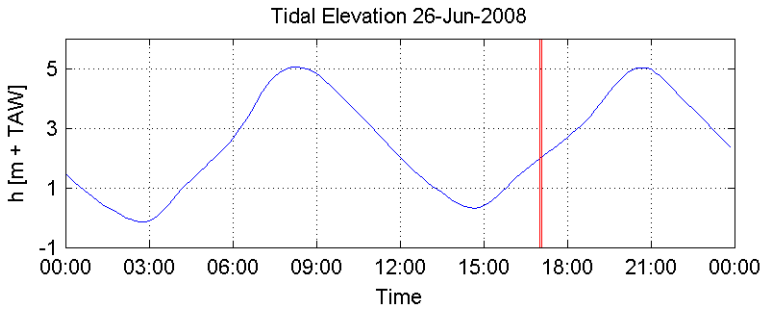
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6091DGDtrl.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

17:00 - 17:04

Time after HW [HH:MM]

-3:37

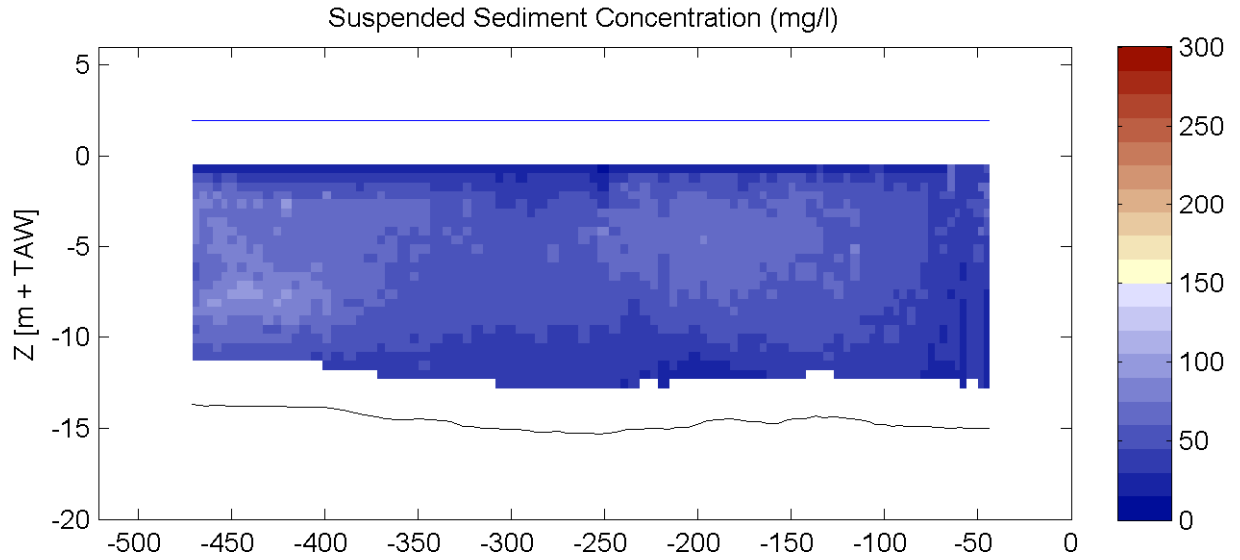
Data Processed by: IMDC

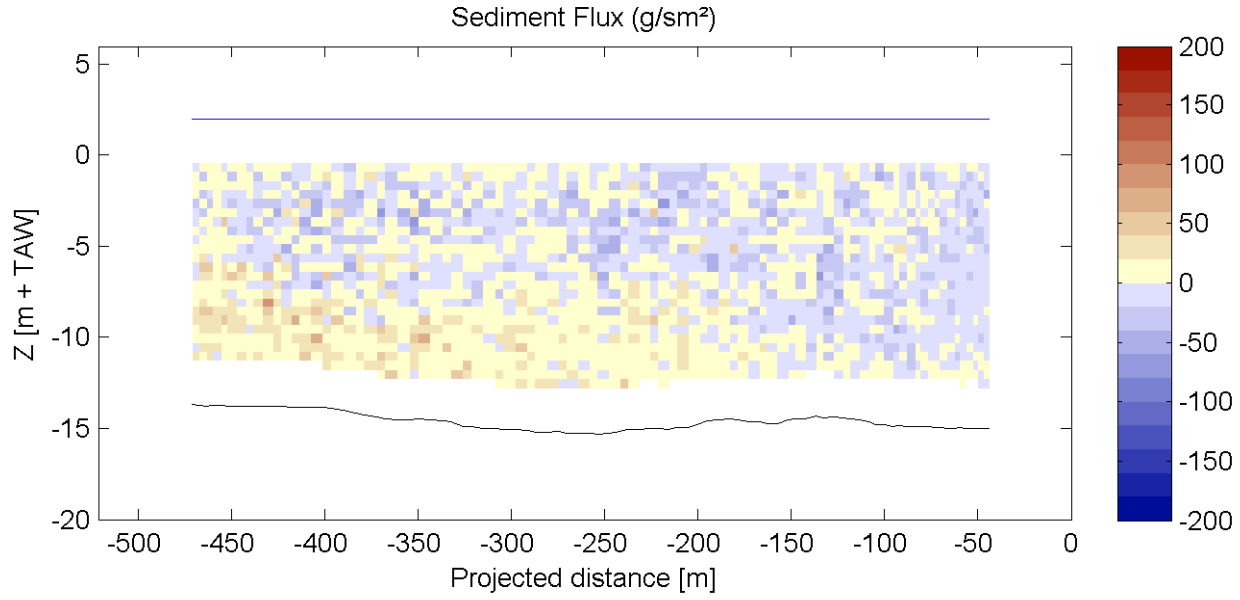
In association with : WL | delft hydraulics, GEMS International

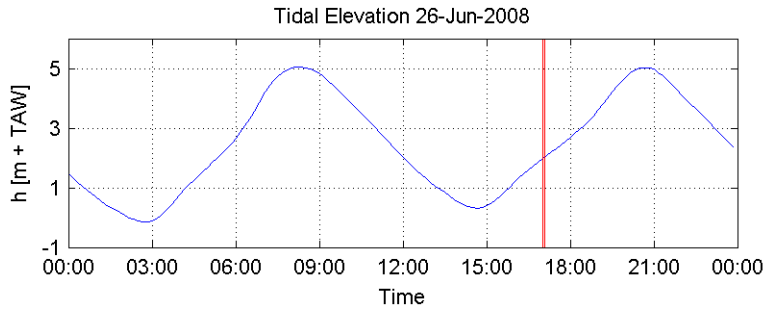
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6091DGDtrl.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

17:00 - 17:04

Time after HW [HH:MM]

-3:37

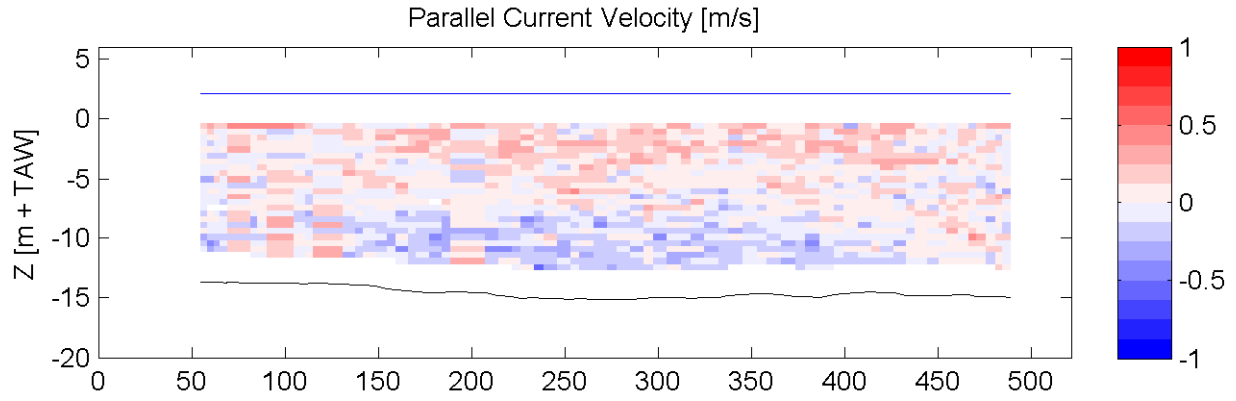
Data Processed by: IMDC

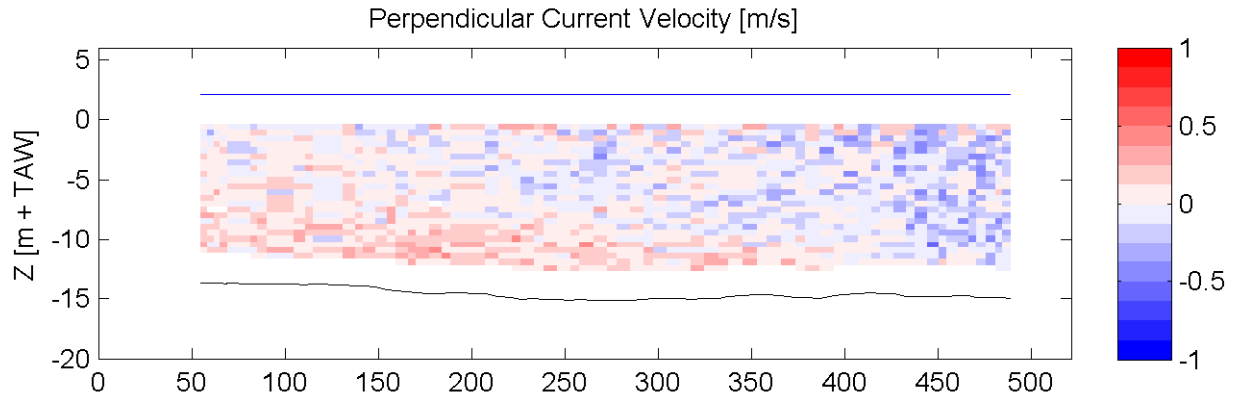
In association with : WL | delft hydraulics, GEMS International

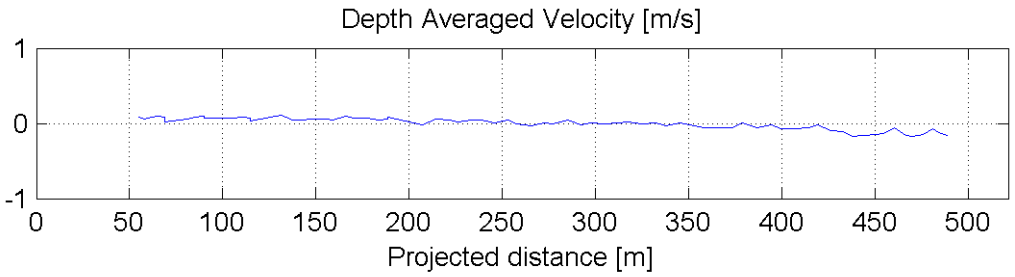
I/RA/11283/08.082/MSA

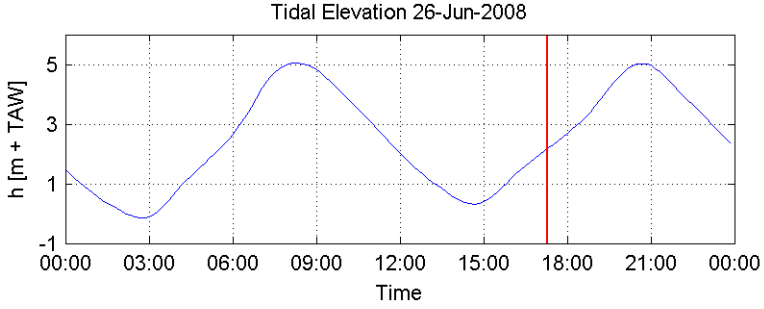
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6093DGDtlr_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

17:14 - 17:18

Time after HW [HH:MM]

-3:23

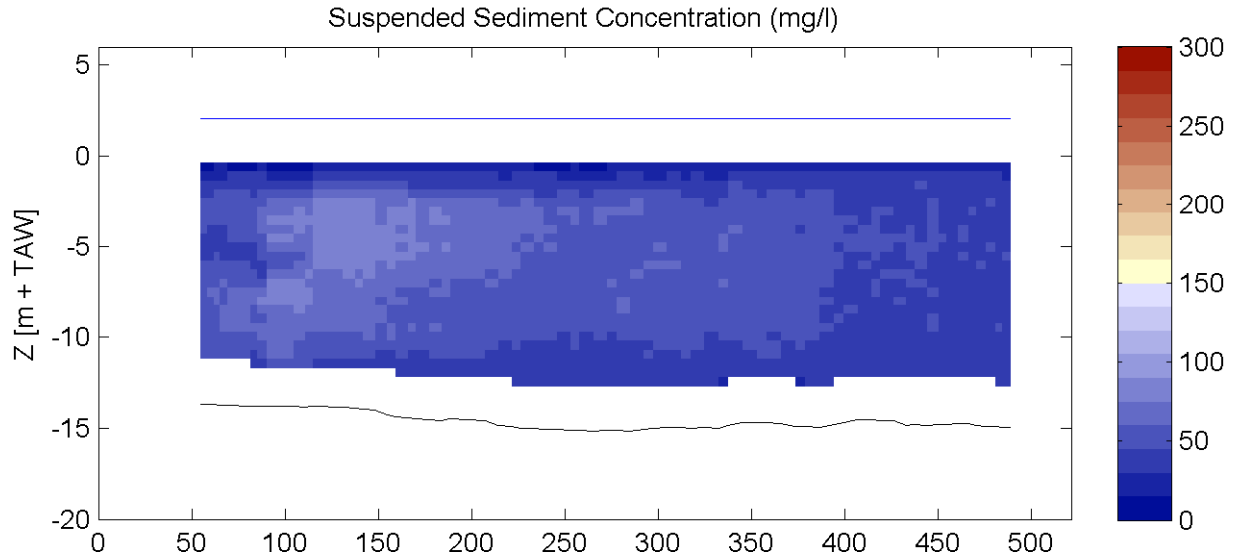
Data Processed by: IMDC

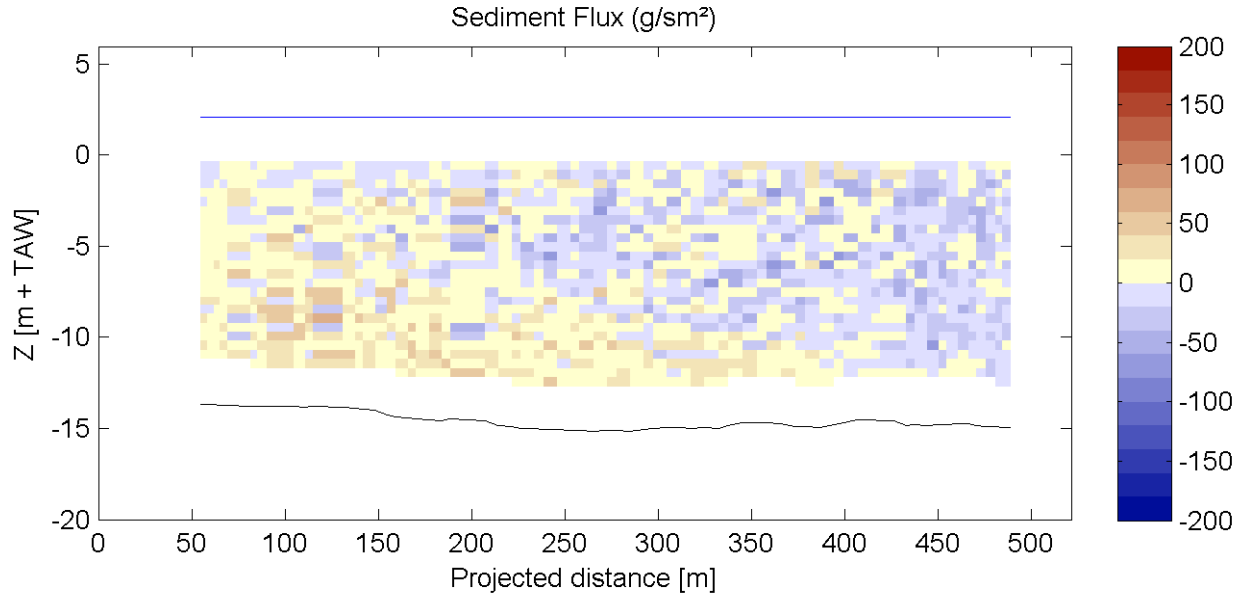
In association with : w.l | delft hydraulics, GEMS

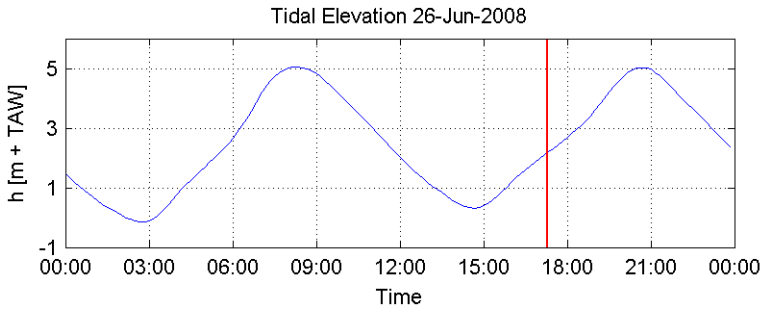
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6093DGDtlr_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

17:14 - 17:18

Time after HW [HH:MM]

-3:23

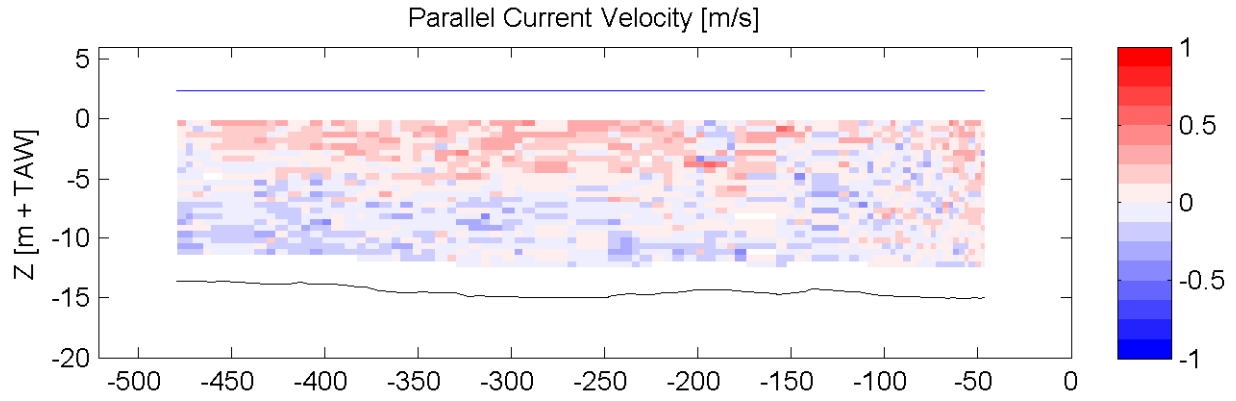
Data Processed by: IMDC

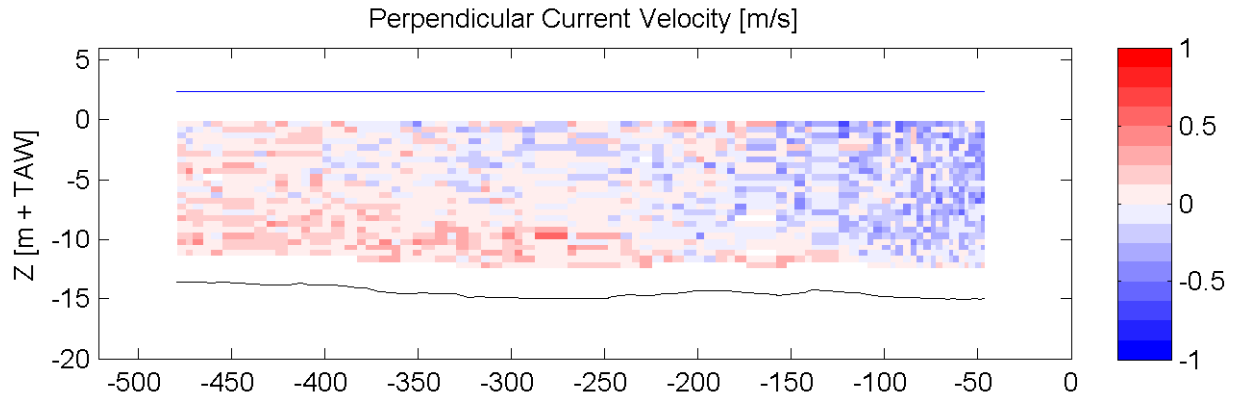
In association with : w.l | delft hydraulics, GEMS

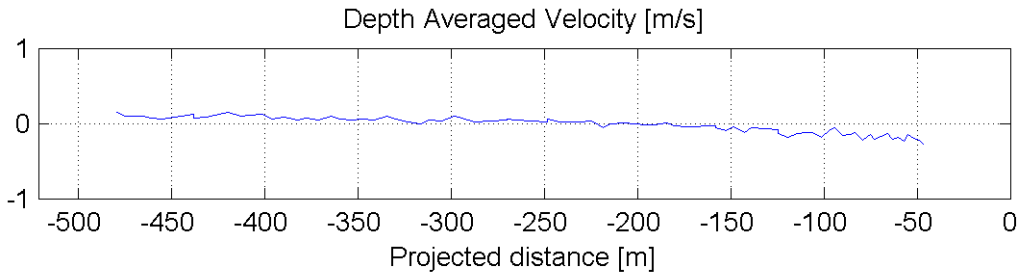
I/RA/11283/08.082/MSA

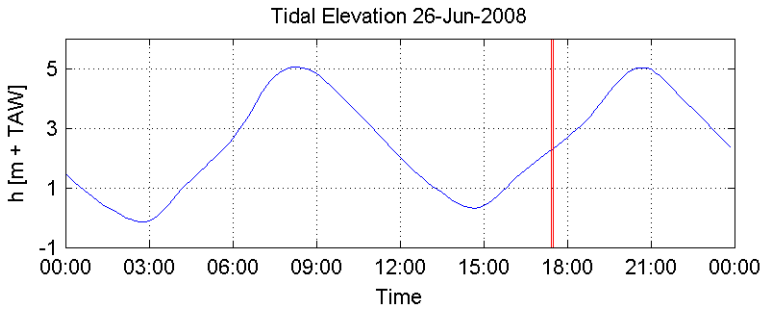
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6095DGDtrl_sub.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

17:26 - 17:30

Time after HW [HH:MM]

-3:11

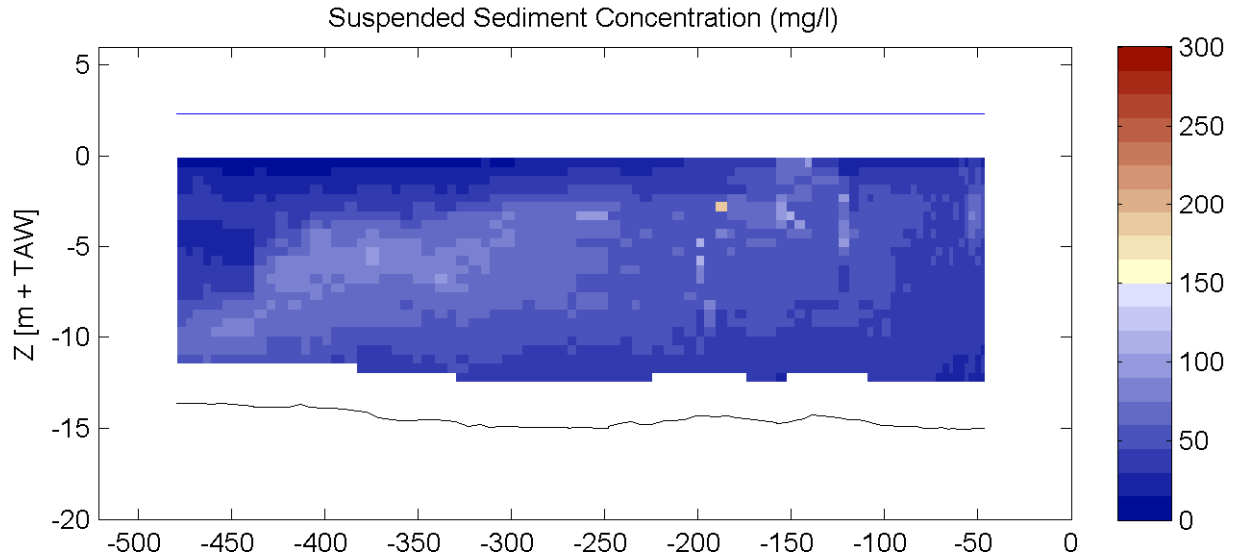
Data Processed by: IMDC

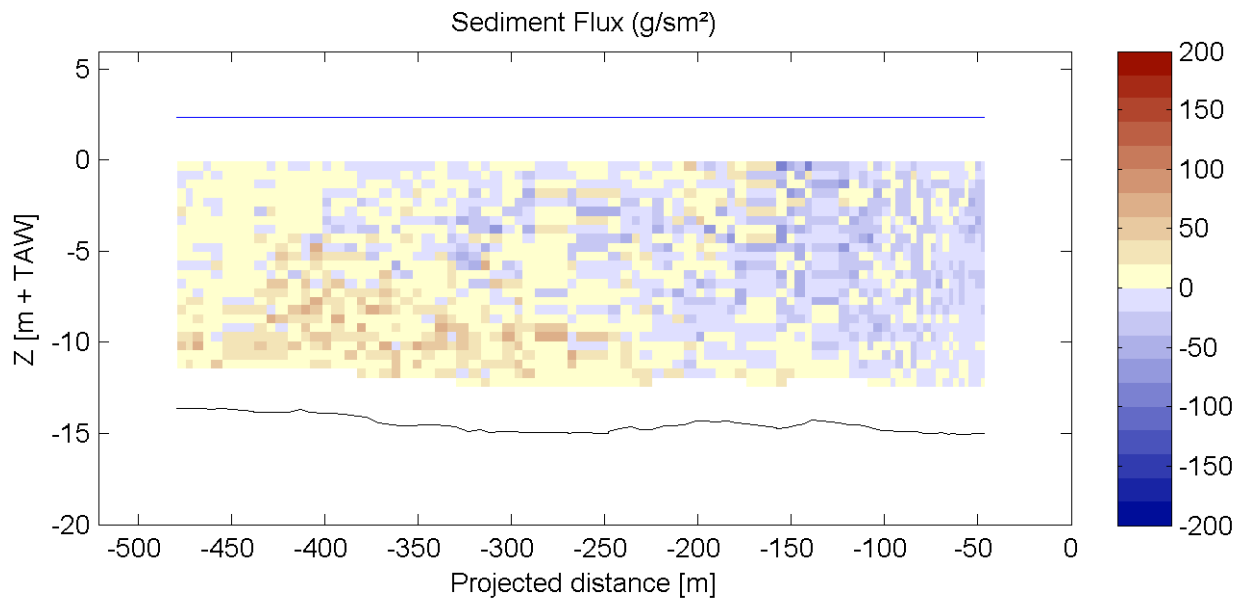
In association with : w.l | delft hydraulics, GEMS

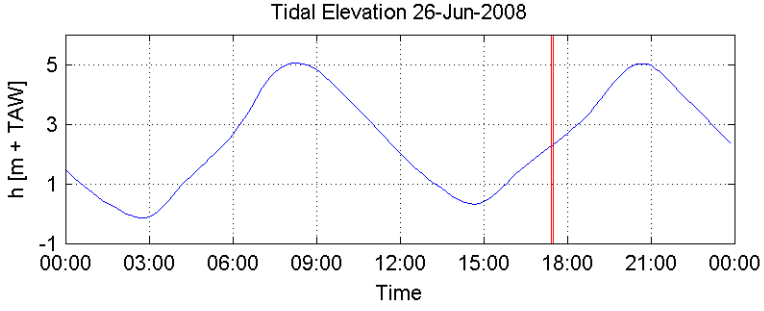
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6095DGDtrl_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

17:26 - 17:30

Time after HW [HH:MM]

-3:11

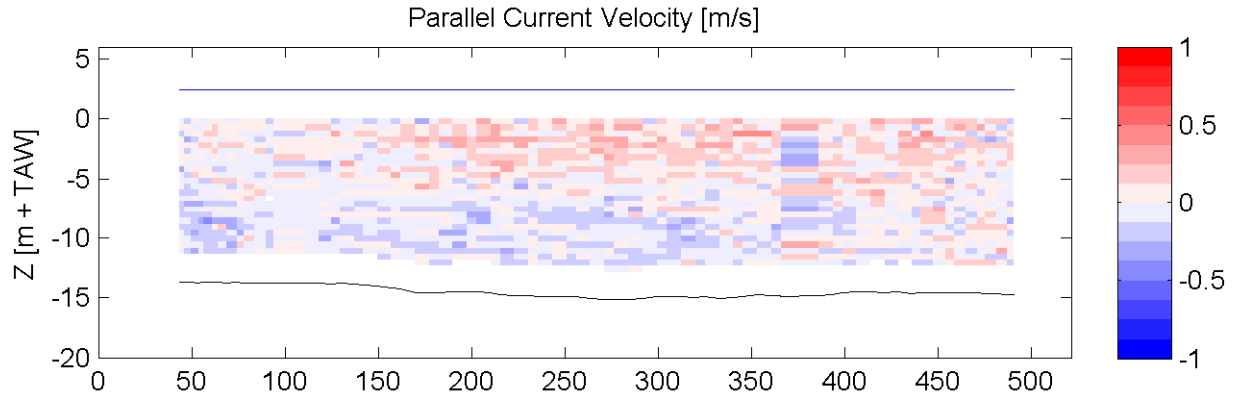
Data Processed by: IMDC

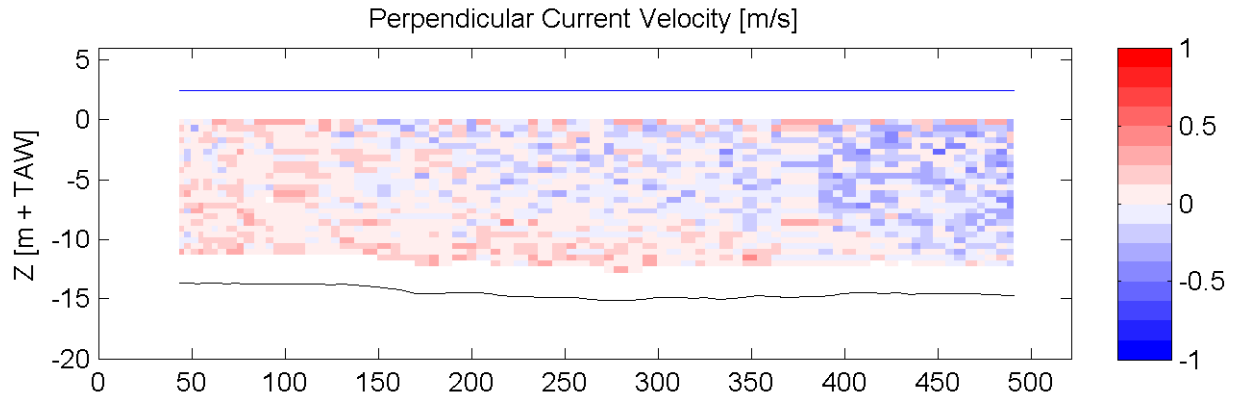
In association with : WL | delft hydraulics, GEMS International

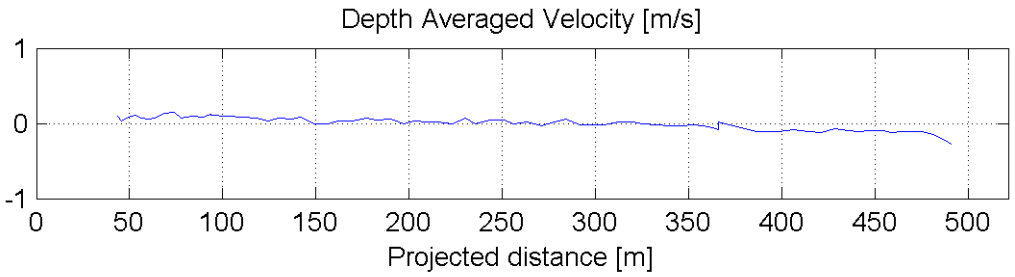
I/RA/11283/08.082/MSA

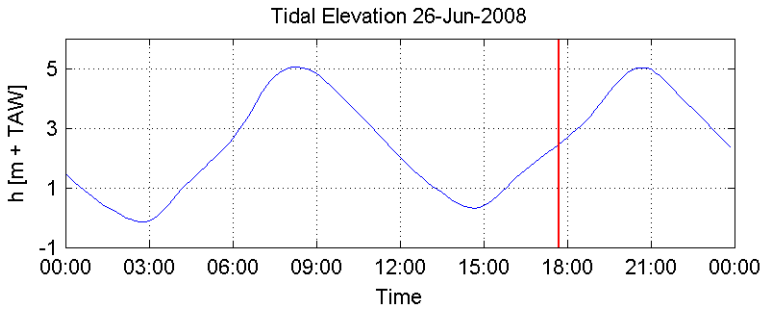
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6097DGDtlr.csv	Location: Transect DGD









HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

17:39 - 17:43

Time after HW [HH:MM]

-2:58

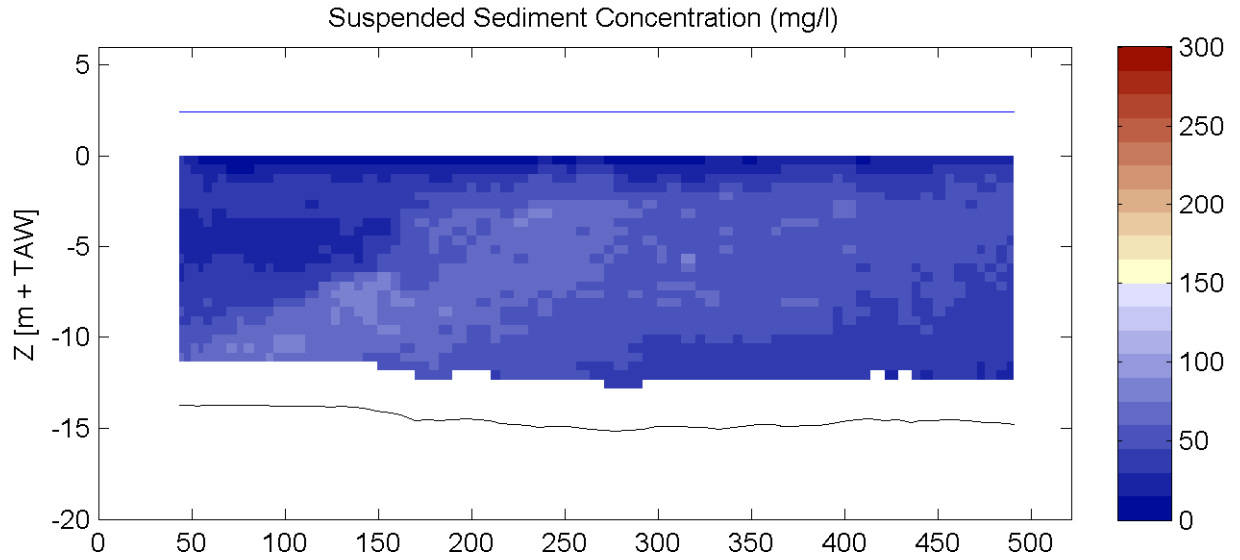
Data Processed by: IMDC

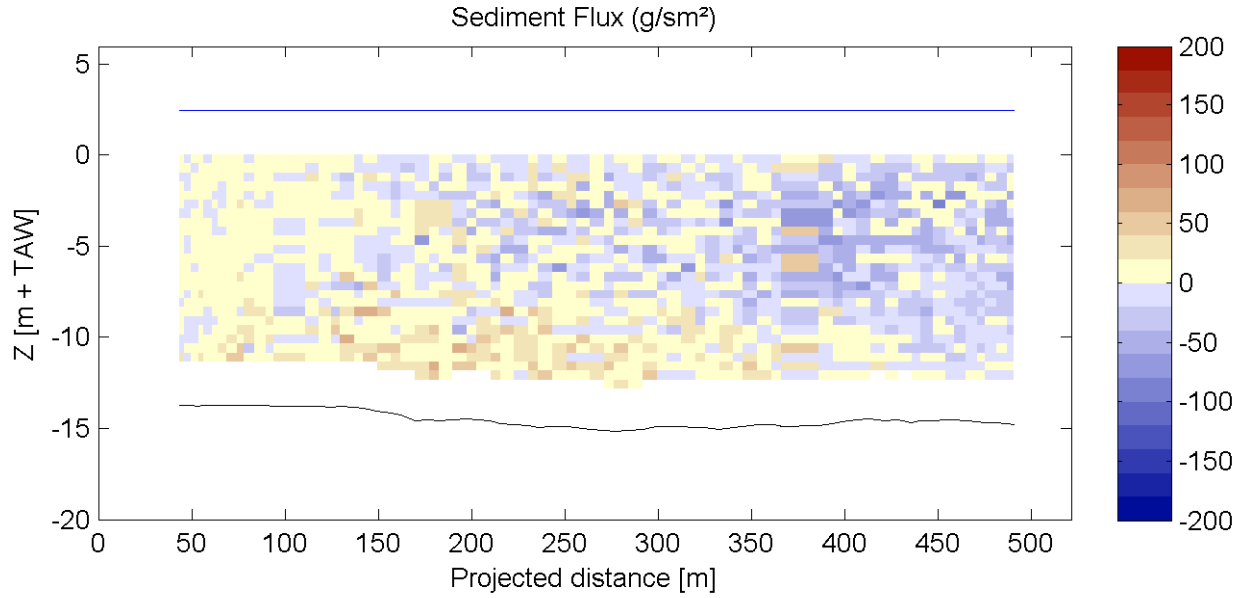
In association with : w.l | delft hydraulics, GEMS

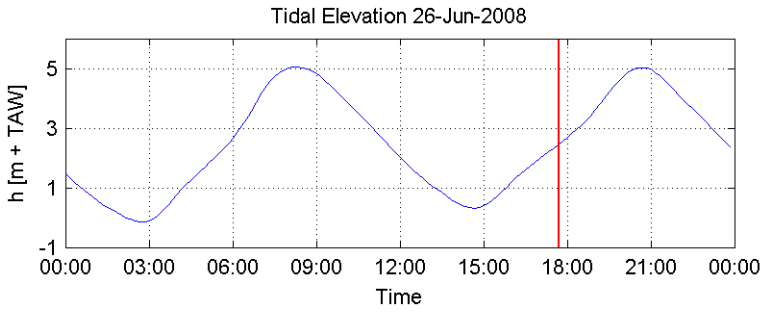
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6097DGDtlr.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

17:39 - 17:43

Time after HW [HH:MM]

-2:58

Data Processed by: IMDC

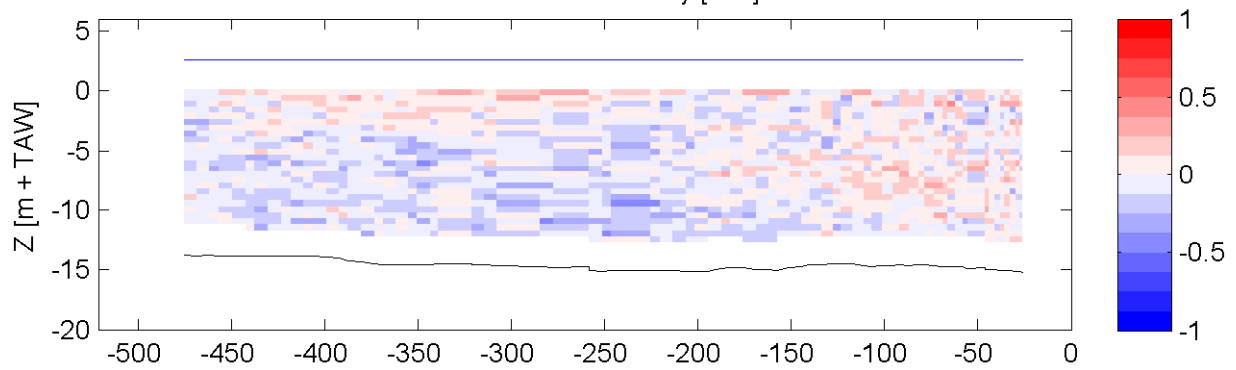
In association with : WL | delft hydraulics, GEMS International

I/RA/11283/08.082/MSA

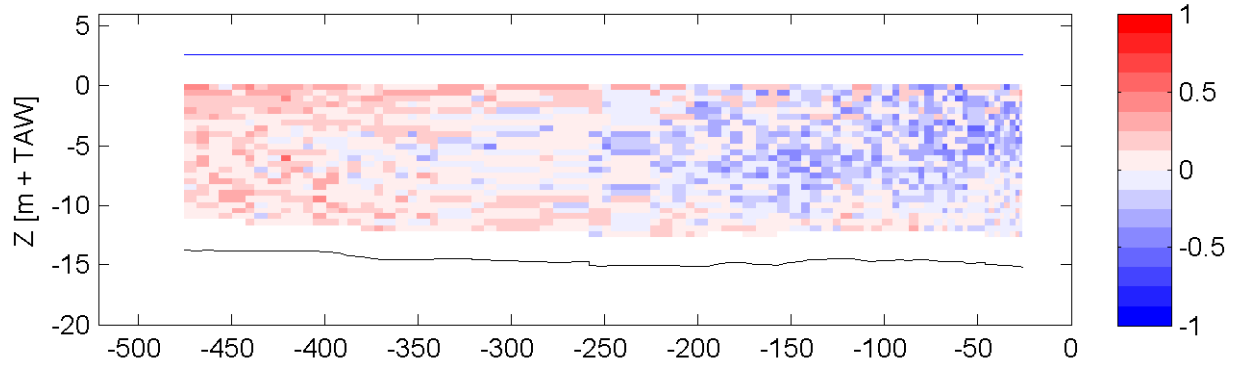
Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6099DGDtrl_sub.csv	Location: Transect DGD

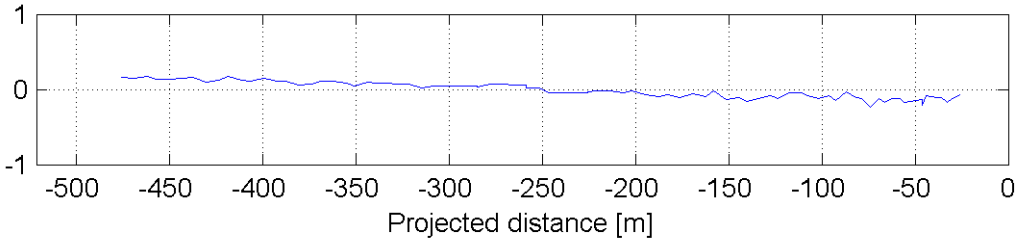
Parallel Current Velocity [m/s]



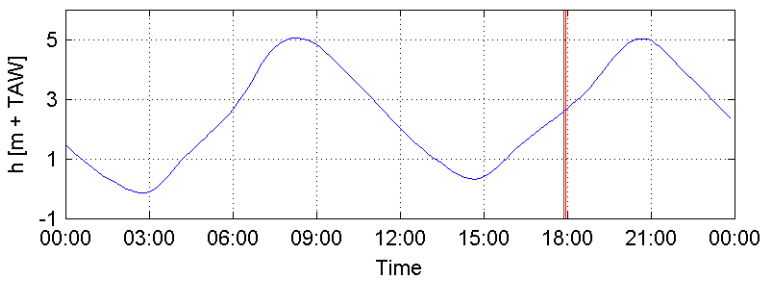
Perpendicular Current Velocity [m/s]



Depth Averaged Velocity [m/s]



Tidal Elevation 26-Jun-2008



HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

17:53 - 17:56

Time after HW [HH:MM]

-2:44

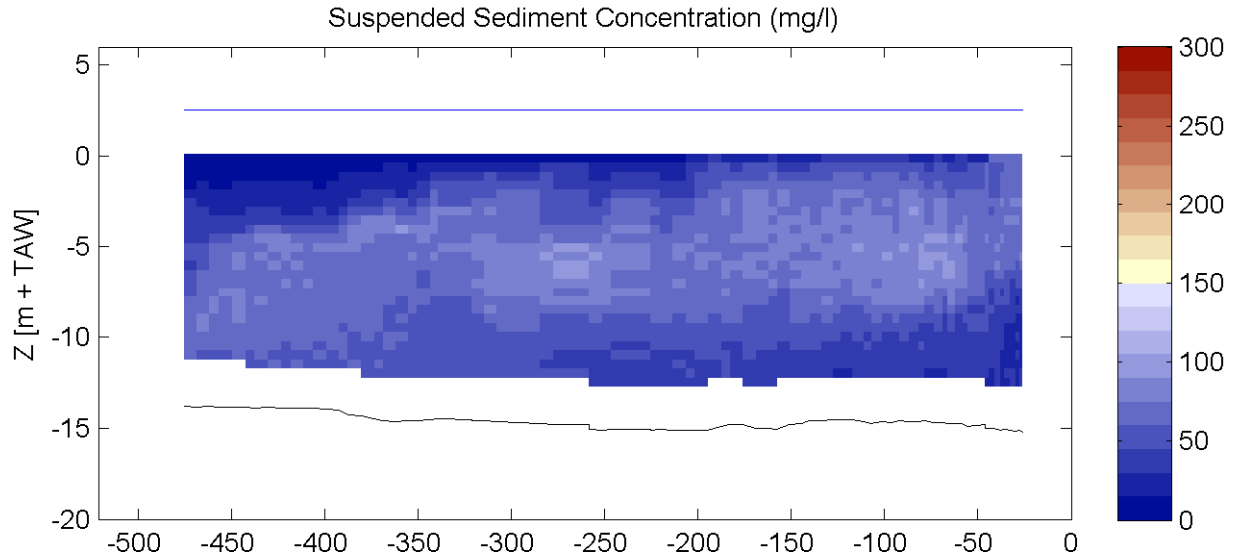
Data Processed by: IMDC

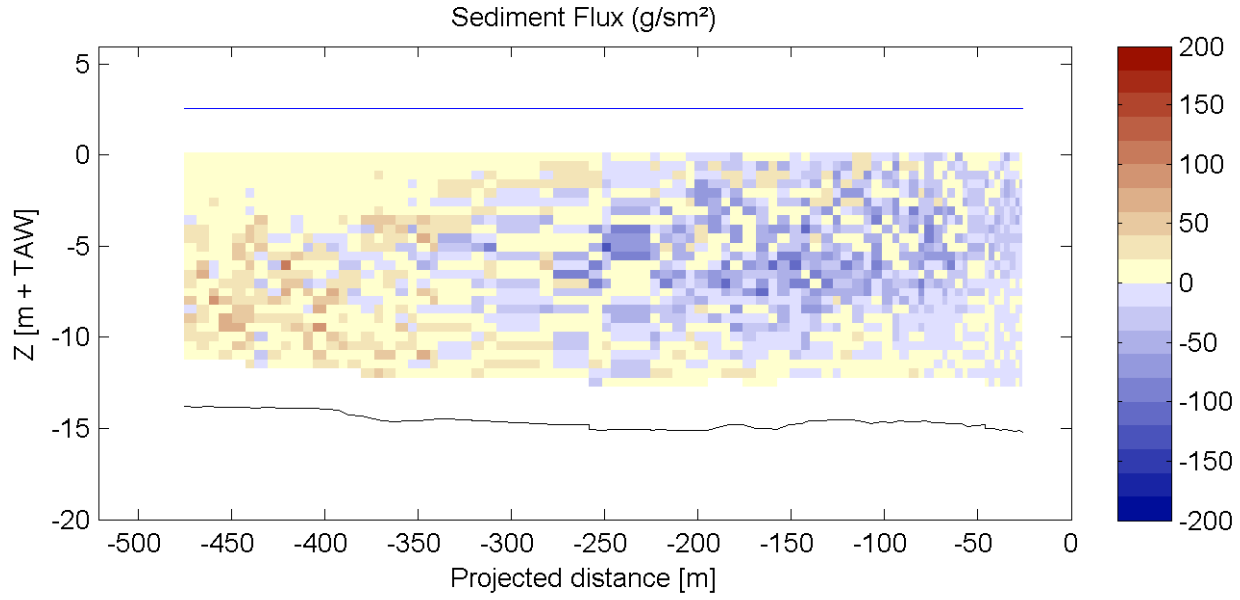
In association with : WL | delft hydraulics, GEMS International

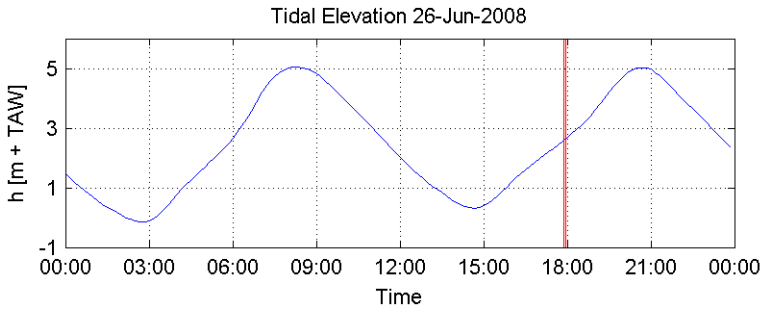
I/RA/11283/08.082/MSA

Through Tide Sediview Measurement Average tide 26/06/2008

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 6099DGDtrl_sub.csv	Location: Transect DGD







HW/LW:
08:20: h = 5.05 m+TAW
14:40: h = 0.31 m+TAW
20:40: h = 5.02 m+TAW

Date / Time [MET] :

26-Jun-2008

17:53 - 17:56

Time after HW [HH:MM]

-2:44

Data Processed by: IMDC

In association with : WL | delft hydraulics, GEMS International

I/RA/11283/08.082/MSA

APPENDIX H. DISCHARGE, CONCENTRATION AND SEDIMENT FLUX FOR THE TOTAL CROSS-SECTION

Discharge distribution over the cross section: positive is from dock to river

Filename	*Time to HW [hh:mm]*	*Qmid [m³/s]*	*Qtop [m³/s]*	*Qbottom [m³/s]*	*Qleft [m³/s]*	*Qright [m³/s]*	*Qtotal [m³/s]*
6003DGDtlr_sub.csv	-2:44	-98	-29	-16	34	-135	-243
6005DGDtrl_sub.csv	-2:31	-61	98	-8	120	-157	-9
6007DGDtlr_sub.csv	-2:16	-17	65	-3	144	-143	46
6009DGDtrl_sub.csv	-2:03	-57	61	-7	61	-130	-72
6011DGDtlr.csv	-1:50	-75	81	-11	53	-92	-44
6013DGDtrl.csv	-1:31	-89	97	-14	132	-139	-12
6015DGDtlr_sub.csv	-1:17	-135	24	-19	174	-190	-146
6017DGDtrl_sub.csv	-1:05	-136	48	-19	128	-274	-254
6019DGDtlr_sub.csv	-0:51	-108	0	-16	125	-124	-123
6021DGDtrl.csv	-0:39	163	210	22	169	-172	392
6023DGDtlr_sub.csv	-0:26	146	133	22	348	-173	475
6025DGDtrl.csv	-0:06	187	197	31	132	-169	377
6027DGDtlr_sub.csv	0:06	106	238	16	194	-120	434
6029DGDtrl_sub.csv	0:29	208	328	31	101	97	766
6031DGDtlr_sub.csv	0:40	364	370	54	153	-67	874
6033DGDtrl.csv	0:51	243	321	36	122	-49	673
6035DGDtlr_sub.csv	1:01	179	288	26	230	51	774
6037DGDtrl.csv	1:12	210	242	33	111	165	762
6039DGDtlr_sub.csv	1:23	307	309	46	44	101	808
6041DGDtrl.csv	1:34	244	283	37	44	113	721
6043DGDtlr_sub.csv	1:46	194	241	30	-67	60	457
6045DGDtrl.csv	1:59	238	249	35	-219	54	356
6047DGDtlr_sub.csv	2:12	190	243	28	-203	73	332
6049DGDtrl.csv	2:24	259	281	38	-15	100	663
6051DGDtlr_sub.csv	2:35	237	220	34	-72	49	469
6053DGDtrl_sub.csv	2:56	272	200	43	-22	85	578
6055DGDtlr_sub.csv	3:11	229	174	35	-11	50	478
6057DGDtrl_sub.csv	3:26	197	238	30	-95	91	462
6059DGDtlr.csv	3:39	235	204	37	96	26	597
6061DGDtlr_sub.csv	4:45	211	146	32	69	27	484
6063DGDtrl_sub.csv	4:55	233	129	37	13	35	446
6065DGDtlr.csv	5:11	214	49	35	25	30	353
6067DGDtrl_sub.csv	5:23	228	66	36	-93	37	275
6069DGDtlr_sub.csv	5:35	199	51	32	-77	-121	84
6071DGDtrl_sub.csv	5:49	186	83	30	-60	15	254
6073DGDtlr_sub.csv	6:10	99	7	16	-50	11	83
6075DGDtrl_sub.csv	-5:53	150	14	24	-100	15	104
6077DGDtlr_sub.csv	-5:37	172	-15	27	-117	47	113
6079DGDtrl.csv	-5:26	-29	-61	-4	-114	17	-192
6081DGDtlr_sub.csv	-5:13	-2	24	0	-183	22	-140

Filename	*Time to HW [hh:mm]*	*Qmid [m³/s]*	*Qtop [m³/s]*	*Qbottom [m³/s]*	*Qleft [m³/s]*	*Qright [m³/s]*	*Qtotal [m³/s]*
6083DGDtrl.csv	-5:02	-114	-52	-20	-66	65	-187
6085DGDtlr_sub.csv	-4:49	-42	-69	-7	-103	7	-213
6087DGDtrl_sub.csv	-4:27	-106	-48	-17	-87	-29	-287
6089DGDtlr_sub.csv	-3:50	-3	-52	0	36	-58	-78
6091DGDtrl.csv	-3:37	-42	-7	-6	48	-112	-119
6093DGDtlr_sub.csv	-3:23	-28	30	-6	62	-60	-1
6095DGDtrl_sub.csv	-3:11	-19	-28	-3	62	-161	-148
6097DGDtlr.csv	-2:58	-69	44	-9	71	-76	-39
6099DGDtrl_sub.csv	-2:44	-29	84	-3	105	-51	105

Sediment flux distribution over the cross section: positive is from dock to river

Filename	*Time to HW [hh:mm]*	*Fmid [kg/s]*	*Ftop [kg/s]*	*Fbottom [kg/s]*	*Fleft [kg/s]*	*Fright [kg/s]*	*Ftotal [kg/s]*
6003DGDtlr_sub.csv	-2:44	-7	-1	-1	1	-7	-14
6005DGDtrl_sub.csv	-2:31	-16	1	-1	5	-19	-29
6007DGDtlr_sub.csv	-2:16	-10	0	-1	9	-14	-15
6009DGDtrl_sub.csv	-2:03	-15	0	-1	3	-11	-25
6011DGDtlr.csv	-1:50	-11	1	-2	2	-7	-17
6013DGDtrl.csv	-1:31	-7	2	0	7	-7	-5
6015DGDtlr_sub.csv	-1:17	-11	0	1	8	-11	-14
6017DGDtrl_sub.csv	-1:05	-7	0	1	10	-20	-16
6019DGDtlr_sub.csv	-0:51	-12	0	-2	7	-7	-13
6021DGDtrl.csv	-0:39	-10	4	0	13	-16	-10
6023DGDtlr_sub.csv	-0:26	-2	4	0	39	-24	18
6025DGDtrl.csv	-0:06	-11	4	5	13	-22	-11
6027DGDtlr_sub.csv	0:06	-18	3	3	20	-12	-4
6029DGDtrl_sub.csv	0:29	-23	4	6	8	9	4
6031DGDtlr_sub.csv	0:40	-14	2	12	16	-5	10
6033DGDtrl.csv	0:51	-23	3	7	11	-3	-6
6035DGDtlr_sub.csv	1:01	-31	1	5	19	3	-3
6037DGDtrl.csv	1:12	-14	1	5	9	4	5
6039DGDtlr_sub.csv	1:23	-6	1	4	5	2	6
6041DGDtrl.csv	1:34	-3	1	1	2	2	5
6043DGDtlr_sub.csv	1:46	-3	1	1	-3	2	-2
6045DGDtrl.csv	1:59	0	1	1	-8	1	-4
6047DGDtlr_sub.csv	2:12	0	2	1	-6	1	-1
6049DGDtrl.csv	2:24	-2	2	1	-1	2	3
6051DGDtlr_sub.csv	2:35	-2	1	1	-5	1	-3
6053DGDtrl_sub.csv	2:56	1	1	2	-1	2	4
6055DGDtlr_sub.csv	3:11	-2	1	2	-1	1	1
6057DGDtrl_sub.csv	3:26	-8	1	0	-8	3	-11
6059DGDtlr.csv	3:39	1	1	3	6	1	11
6061DGDtlr_sub.csv	4:45	5	1	1	4	0	12
6063DGDtrl_sub.csv	4:55	7	1	1	1	1	11
6065DGDtlr.csv	5:11	8	0	1	1	0	11
6067DGDtrl_sub.csv	5:23	5	0	1	-3	0	4
6069DGDtlr_sub.csv	5:35	3	-4	1	-5	-2	-7
6071DGDtrl_sub.csv	5:49	3	1	1	-3	0	1
6073DGDtlr_sub.csv	6:10	0	-1	0	-2	0	-2
6075DGDtrl_sub.csv	-5:53	4	0	1	-3	0	2
6077DGDtlr_sub.csv	-5:37	4	0	1	-3	1	3
6079DGDtrl.csv	-5:26	-3	-2	0	-4	0	-9
6081DGDtlr_sub.csv	-5:13	-1	0	0	-6	0	-6

Filename	*Time to HW [hh:mm]*	*Fmid [kg/s]*	*Ftop [kg/s]*	*Fbottom [kg/s]*	*Fleft [kg/s]*	*Fright [kg/s]*	*Ftotal [kg/s]*
6083DGDtrl.csv	-5:02	-5	-1	-1	-2	3	-5
6085DGDtlr_sub.csv	-4:49	-2	-1	0	-3	0	-6
6087DGDtrl_sub.csv	-4:27	-6	-1	-1	-4	-1	-12
6089DGDtlr_sub.csv	-3:50	0	-2	0	2	-2	-1
6091DGDtrl.csv	-3:37	-2	0	0	3	-4	-4
6093DGDtlr_sub.csv	-3:23	0	1	0	3	-2	1
6095DGDtrl_sub.csv	-3:11	0	-2	0	2	-7	-6
6097DGDtlr.csv	-2:58	-4	1	0	3	-3	-4
6099DGDtrl_sub.csv	-2:44	-9	0	1	5	-3	-5

APPENDIX I. AVERAGE SEDIMENT CONCENTRATION FOR THE TOTAL CROSS-SECTION

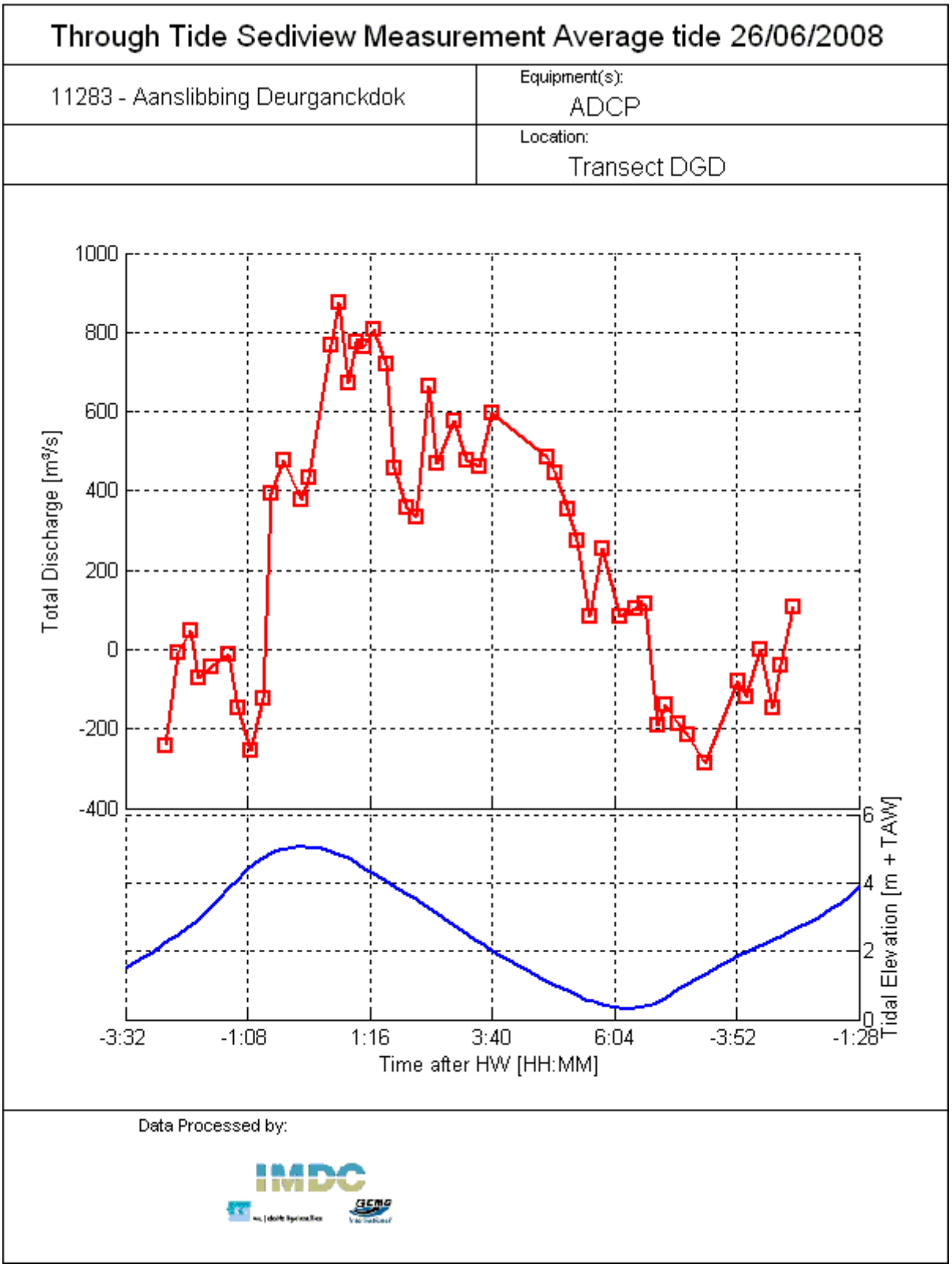
Transect name	*Time [hh:mm MET]*	*Time after HW [hh:mm]*	*Average measured SS Concentration [mg/l]*
6003DGDtlr_sub.csv	5:18	-2:44	48
6005DGDtrl_sub.csv	5:33	-2:31	71
6007DGDtlr_sub.csv	5:47	-2:16	74
6009DGDtrl_sub.csv	6:00	-2:03	78
6011DGDtlr.csv	6:15	-1:50	64
6013DGDtrl.csv	6:27	-1:31	59
6015DGDtlr_sub.csv	6:45	-1:17	76
6017DGDtrl_sub.csv	6:59	-1:05	83
6019DGDtlr_sub.csv	7:12	-0:51	60
6021DGDtrl.csv	7:39	-0:39	90
6023DGDtlr_sub.csv	7:45	-0:26	103
6025DGDtrl.csv	8:00	-0:06	100
6027DGDtlr_sub.csv	8:12	0:06	97
6029DGDtrl_sub.csv	8:24	0:29	97
6031DGDtlr_sub.csv	8:48	0:40	84
6033DGDtrl.csv	8:58	0:51	76
6035DGDtlr_sub.csv	9:09	1:01	76
6037DGDtrl.csv	9:15	1:12	51
6039DGDtlr.csv	9:32	1:23	45
6041DGDtrl.csv	9:41	1:34	27
6043DGDtlr_sub.csv	9:54	1:46	28
6045DGDtrl.csv	10:04	1:59	23
6047DGDtlr.csv	10:17	2:12	18
6049DGDtrl.csv	10:31	2:24	26
6051DGDtlr_sub.csv	10:40	2:35	31
6053DGDtrl.csv	10:53	2:56	29
6055DGDtlr_sub.csv	11:14	3:11	36
6057DGDtrl_sub.csv	11:29	3:26	37
6059DGDtlr.csv	11:44	3:39	39
6061DGDtlr_sub.csv	11:58	4:45	39
6063DGDtrl.csv	13:02	4:55	39
6065DGDtlr.csv	13:14	5:11	42
6067DGDtrl.csv	13:29	5:23	25
6069DGDtlr_sub.csv	13:42	5:35	28
6071DGDtrl_sub.csv	14:00	5:49	25
6073DGDtlr_sub.csv	14:07	6:10	30
6075DGDtrl_sub.csv	14:28	-5:53	26
6077DGDtlr.csv	14:45	-5:37	32
6079DGDtrl.csv	15:01	-5:26	32
6081DGDtlr_sub.csv	15:12	-5:13	37
6083DGDtrl.csv	15:30	-5:02	39

6085DGDtlr.csv	15:36	-4:49	40
6087DGDtrl_sub.csv	15:49	-4:27	43
6089DGDtlr.csv	16:10	-3:50	52
6091DGDtrl.csv	16:48	-3:37	50
6093DGDtlr_sub.csv	17:00	-3:23	49
6095DGDtrl_sub.csv	17:15	-3:11	48
6097DGDtlr.csv	17:26	-2:58	46
6099DGDtrl_sub.csv	17:40	-2:44	56

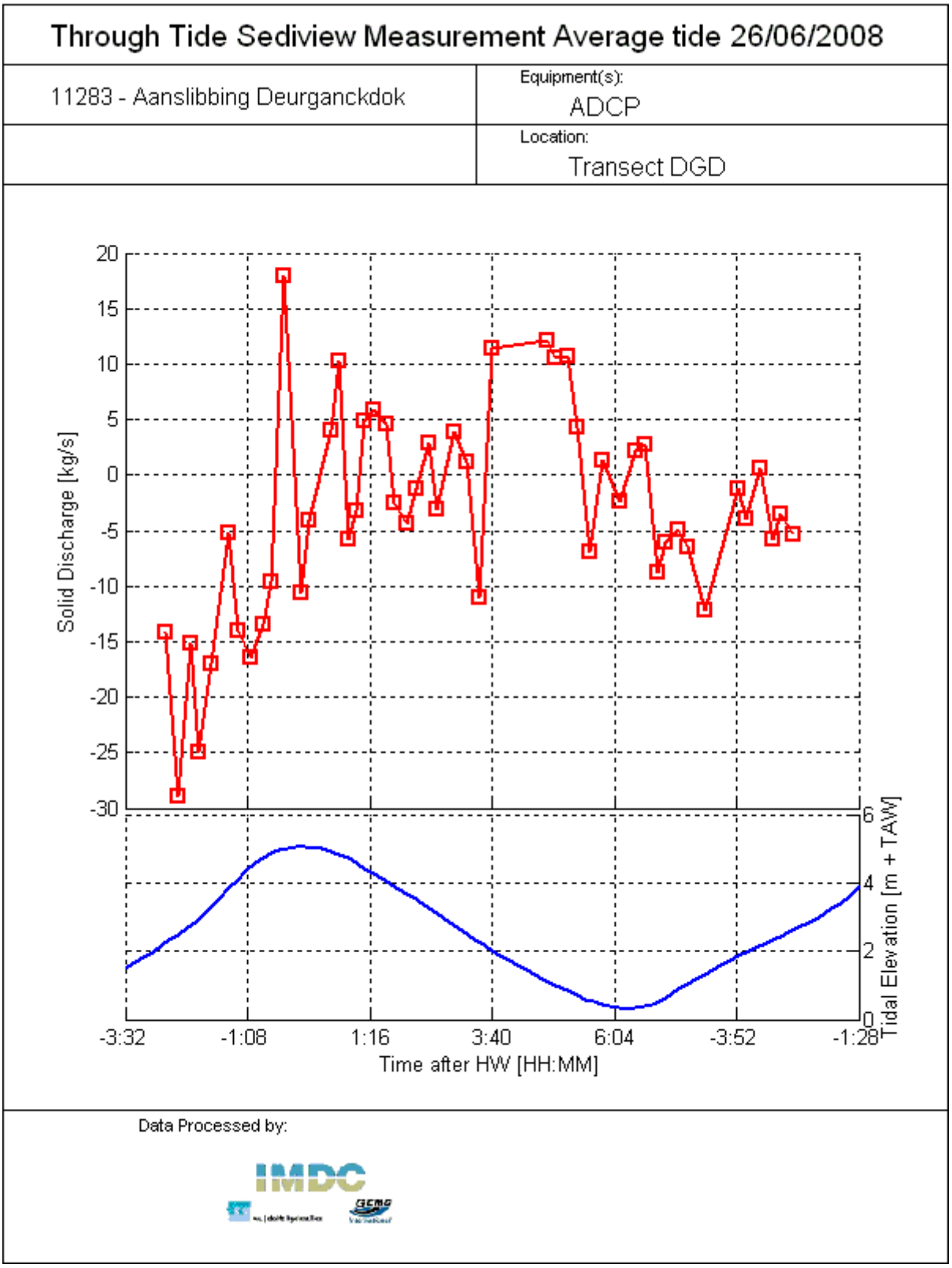
Tide	***Concentration [mg/l]***		
	Average	***Minimum***	***Maximum***
Ebb	43	18	97
Flood	60	32	103

APPENDIX J.

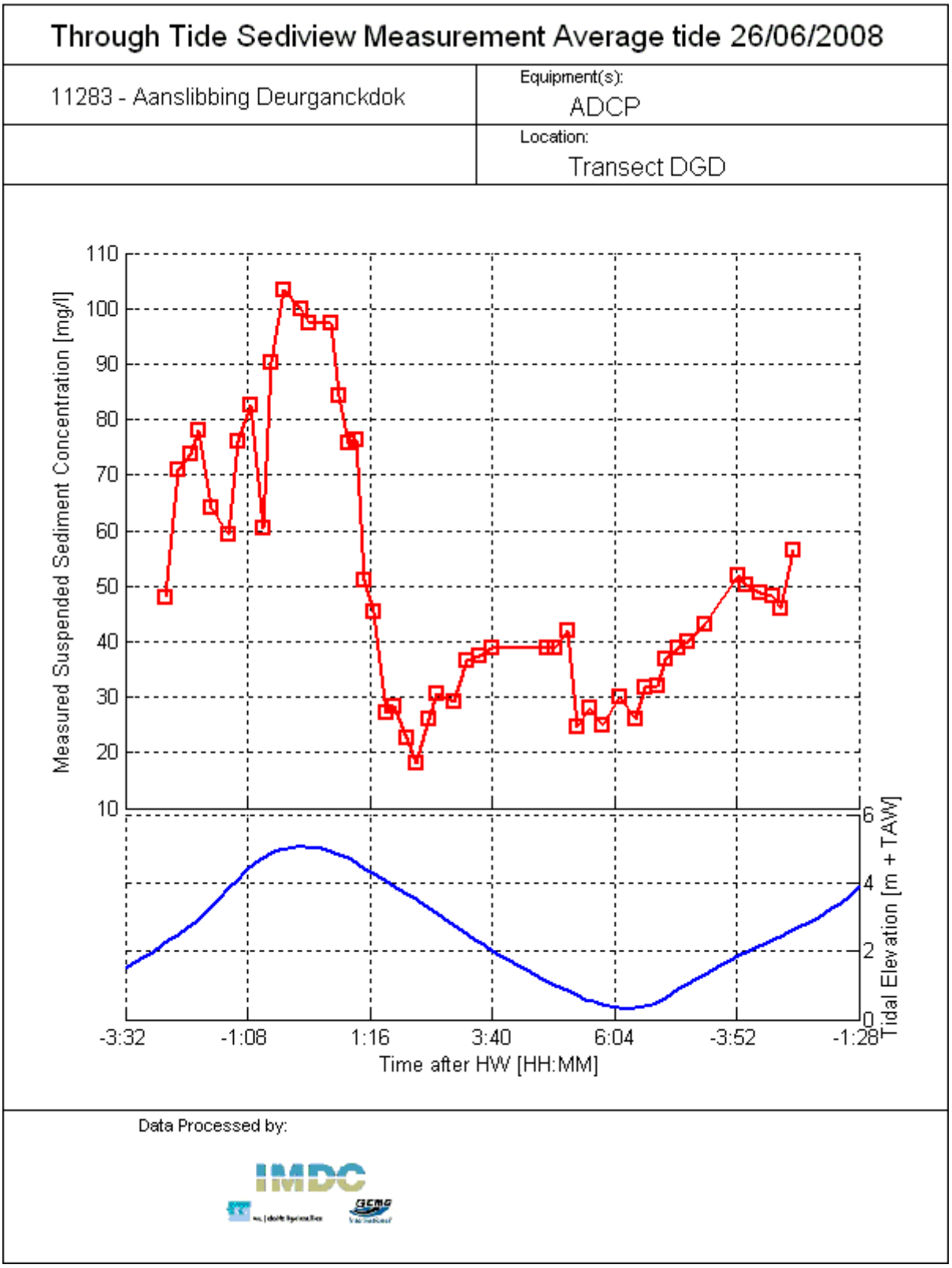
TEMPORAL VARIATION OF TOTAL FLUX, TOTAL DISCHARGE AND SUSPENDED SEDIMENT CONCENTRATION



Total discharge through the measured cross section, positive is from dock to river



Total flux through the measured cross section, positive is from dock to river



Suspended sediment concentration through the measured cross section

APPENDIX K.

OVERVIEW OF HCBS2 AND AANSLIBBING DEURGANCKDOK REPORTS

Report	Description of HCBS2
Ambient Conditions Lower Sea Scheldt	
5.3	Overview of ambient conditions in the river Scheldt – January-June 2006 (I/RA/11291/06.088/MSA)
5.4	Overview of ambient conditions in the river Scheldt – July-December 2006 (I/RA/11291/06.089/MSA)
5.5	Overview of ambient conditions in the river Scheldt : RCM-9 buoy 84 & 97 (1/1/2007 -31/3/2007) (I/RA/11291/06.090/MSA)
5.6	Analysis of ambient conditions during 2006 (I/RA/11291/06.091/MSA)
Calibration	
6.1	Winter Calibration (I/RA/11291/06.092/MSA)
6.2	Summer Calibration and Final Report (I/RA/11291/06.093/MSA)
Through tide Measurements Winter 2006	
7.1	21/3 Scheldewacht – Deurganckdok – Salinity Distribution (I/RA/11291/06.094/MSA)
7.2	22/3 Parel 2 – Deurganckdok (I/RA/11291/06.095/MSA)
7.3	22/3 Laure Marie – Liefkenshoek (I/RA/11291/06.096/MSA)
7.4	23/3 Parel 2 – Schelle (I/RA/11291/06.097/MSA)
7.5	23/3 Laure Marie – Deurganckdok (I/RA/11291/06.098/MSA)
7.6	23/3 Veremans Waarde (I/RA/11291/06.099/MSA)
HCBS Near bed continuous monitoring (Frames)	
8.1	Near bed continuous monitoring winter 2006 (I/RA/11291/06.100/MSA)
INSSEV	
9	Settling Velocity - INSSEV summer 2006 (I/RA/11291/06.102/MSA)
Cohesive Sediment	
10	Cohesive sediment properties summer 2006 (I/RA/11291/06.103/MSA)
Through tide Measurements Summer 2006	
11.1	Through Tide Measurement Sediview and Siltprofiler 27/9 Stream - Liefkenshoek (I/RA/11291/06.104/MSA)
11.2	Through Tide Measurement Sediview 27/9 Veremans - Raai K (I/RA/11291/06.105/MSA)
11.3	Through Tide Measurement Sediview and Siltprofiler 28/9 Stream - Raai K (I/RA/11291/06.106/MSA)
11.4	Through Tide Measurement Sediview 28/9 Veremans - Waarde(I/RA/11291/06.107/MSA)
11.5	Through Tide Measurements Sediview 28/9 Parel 2 - Schelle (I/RA/11291/06.108/MSA)
11.6	Through Tide measurement 26/9 Scheldewacht – Deurganckdok – Salinity Distribution (I/RA/11291/06.161/MSA)

Analysis	
12	Report concerning the presence of HCBS layers in the Scheldt river (I/RA/11291/06.109/MSA)

Report	**Description of Opvolging aanslibbing Deurganckdok between April 2006 till March 2008**
Sediment Balance: Bathymetry surveys, Density measurements, Maintenance and construction dredging activities	
1.1	Sediment Balance: Three monthly report 1/4/2006 – 30/06/2006 (I/RA/11283/06.113/MSA)
1.2	Sediment Balance: Three monthly report 1/7/2006 – 30/09/2006 (I/RA/11283/06.114/MSA)
1.3	Sediment Balance: Three monthly report 1/10/2006 – 31/12/2006 (I/RA/11283/06.115/MSA)
1.4	Sediment Balance: Three monthly report 1/1/2007 – 31/03/2007 (I/RA/11283/06.116/MSA)
1.5	Annual Sediment Balance (I/RA/11283/06.117/MSA)
1.6	Sediment balance Bathymetry: 2005 – 3/2006 (I/RA/11283/06.118/MSA)
1.10	Sediment Balance: Three monthly report 1/4/2007 - 30/06/2007 (I/RA/11283/07.081/MSA)
1.11	Sediment Balance: Three monthly report 1/7/2007 – 30/09/2007 (I/RA/11283/07.082/MSA)
1.12	Sediment Balance: Three monthly report 1/10/2007 – 31/12/2007 (I/RA/11283/07.083/MSA)
1.13	Sediment Balance: Three monthly report 1/1/2007 – 31/03/2007 (I/RA/11283/07.084/MSA)
1.14	Annual Sediment Balance (I/RA/11283/07.085/MSA)
Factors contributing to salt and sediment distribution in Deurganckdok: Salt-Silt (OBS3A) & Frame measurements, Through tide measurements (SiltProfiling & ADCP)	
2.1	Through tide measurement Siltprofiler 21/03/2006 Laure Marie (I/RA/11283/06.087/WGO)
2.2	Through tide measurement Siltprofiler 26/09/2006 Stream (I/RA/11283/06.068/MSA)
2.3	Through tide measurement Sediview spring tide 22/03/2006 Veremans (I/RA/11283/06.110/BDC)
2.4	Through tide measurement Sediview spring tide 27/09/2006 Parel 2 (I/RA/11283/06.119/MSA)
2.5	Through tide measurement Sediview average tide 24/10/2007 Parel 2 (I/RA/11283/06.120/MSA)
2.6	Salt-Silt distribution & Frame Measurements Deurganckdok 13/3/2006 – 31/05/2006 (I/RA/11283/06.121/MSA)

Report	Description of Opvolging aanslibbing Deurganckdok between April 2006 till March 2008
2.7	Salt-Silt distribution & Frame Measurements Deurganckdok 15/07/2006 – 31/10/2006 (I/RA/11283/06.122/MSA)
2.8	Salt-Silt distribution & Frame Measurements Deurganckdok 12/02/2007 – 18/04/2007 (I/RA/11283/06.123/MSA)
2.9	Calibration stationary equipment autumn (I/RA/11283/07.095/MSA)
2.10	Through tide measurement Siltprofiler 23 October 2007 (I/RA/11283/07.086/MSA)
2.11	Through tide measurement Salinity Profiling winter (I/RA/11283/07.087/MSA)
2.12	Through tide measurement Sediview winter 11 March 2008 Transect I (I/RA/11283/07.088/MSA)
2.13	Through tide measurement Sediview winter 11 March 2008 Transect K (I/RA/11283/07.089/MSA)
2.14	Through tide measurement Sediview winter 11 March 2008 Transect DGD (I/RA/11283/07.090/MSA)
2.15	Through tide measurement Siltprofiler 12 March 2008 (I/RA/11283/07.091/MSA)
2.16	Salt-Silt distribution Deurganckdok summer (21/6/2007 – 30/07/2007) (I/RA/11283/07.092/MSA)
2.17	Salt-Silt distribution & Frame Measurements Deurganckdok autumn (17/09/2007 - 10/12/2007) (I/RA/11283/07.093/MSA)
2.18	Salt-Silt distribution & Frame Measurements Deurganckdok winter (18/02/2008 - 31/3/2008) (I/RA/11283/07.094/MSA)
2.19	Calibration stationary & mobile equipment winter (I/RA/11283/07.096/MSA)
Boundary Conditions: Upriver Discharge, Salt concentration Scheldt, Bathymetric evolution in access channels, dredging activities in Lower Sea Scheldt and access channels	
3.1	Boundary conditions: Three monthly report 1/1/2007 – 31/03/2007 (I/RA/11283/06.127/MSA) including HCBS 2 report 5.5
~~3.2~~	~~Boundary condtions: Annual report (I/RA/11283/06.128/MSA)~~[1]
3.10	Boundary conditions: Three monthly report 1/4/2007 – 30/06/2007 (I/RA/11283/07.097/MSA)
3.11	Boundary conditions: Three monthly report 1/7/2007 – 30/09/2007 (I/RA/11283/07.098/MSA)
3.12	Boundary conditions: Three monthly report 1/10/2007 – 31/12/2007 (I/RA/11283/07.099/MSA)
3.13	Boundary conditions: Three monthly report 1/1/2008 – 31/03/2008 (I/RA/11283/07.100/MSA)
3.14	Boundary conditions: Annual report (I/RA/11283/07.101/MSA)

[1] considered in report 5.6 'Analysis of ambient conditions during 2006' (I/RA/11291/06.091/MSA) in the framework of the study 'Extension of the study about density currents in the Beneden Zeeschelde'

Report	Description of Opvolging aanslibbing Deurganckdok between April 2006 till March 2008
Analysis	
4.1	Analysis of Siltation Processes and Factors (I/RA/11283/06.129/MSA)
4.10	Analysis of Siltation Processes and Factors (I/RA/11283/07.102/MSA)